TEST REPORT FOR
SEPTEMBER 2020 HCL EMISSIONS
PERFORMANCE TESTING
AT THE DESERT VIEW POWER, MECCA PLANT

Prepared For:

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For Submittal To:

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Test Date: **September 9-10, 2020**
Production Date: **October 26, 2020**
Report Number: **W002AS-678786-RT-1697**

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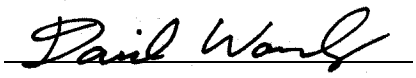
REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature:  Date: 10/26/2020

Name: Dave Wonderly Title: Client Project Manager

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature:  Date: 10/26/2020

Name: Michael Chowsanitphon Title: Reporting Manager

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1.0 INTRODUCTION

Montrose Air Quality Services, LLC (MAQS) was contracted by Desert View Power, to conduct hydrogen chloride (HCl) performance emissions testing at the Desert View Power Project located in Mecca, California. Testing was conducted on September 9-10, 2020. The MAQS test team consisted of Dave Wonderly, David Hoang, and Patrick Whitman. Dave Wonderly was the on-site Qualified Individual for MAQS. Kevin Lawrence of Desert View Power, coordinated plant operations during the test program. Testing was performed according to the test protocol (MAQS Document Number: W002AS-678786-PP-86) submitted to Desert View Power on January 13, 2020. The South Coast Air Quality Management District (SCAQMD) was notified of the test date but did not send a representative.

The emissions tests included measurements on Unit 1 and Unit 2 for hydrogen chloride (HCl). Exhaust flow rate and moisture measurements were performed in conjunction with the testing.

The Desert View Power Facility met the HCL emissions limits required by the U.S. Environmental Protection Agency 40 CFR Part 63 Subpart DDDDD, the Boiler MACT and the U.S. Environmental Protection Agency Operating Permit NSR 4-4-11;SE 87-01 including amendments through August 14, 2003: 7th Amendment Title V permit to operate CB-OP 99-01 dated 8/1/2000.

Tables 1-1 and 1-2 summarize the results of the HCL emissions tests for Unit 1 and Unit 2.

TABLE 1-1
SUMMARY OF EMISSIONS RESULTS UNIT 1
DESERT VIEW POWER
SETEMBER 10, 2020

Parameter/Units	Average Emission Results	Permit Limit	Comment
Hydrochloric Acid			
mg/dscm	17.92		
lb/hr (as HCl)	6.07		
lb/MMBtu	0.016	0.022	PASS

TABLE 1-2
SUMMARY OF EMISSIONS RESULTS UNIT 2
DESERT VIEW POWER
SEPTEMBER 9, 2020

Parameter/Units	Average Emission Results	Permit Limit	Comment
Hydrochloric Acid			
mg/dscm	23.99		
lb/hr (as HCl)	8.25		
lb/MMBtu	0.022	0.022	PASS

2.0 UNIT DESCRIPTION

The Desert View Power plant consists of two 297 MMBtu/hr, circulating bed, biomass-fired boilers. The combined units are designed to produce 47 MW of net electrical output. Each unit is equipped with the following pollution control systems:

- An ammonia injection system for control of NO_x emissions;
- Cyclonic mixing of injected ammonia with flue gas to provide for a minimum amount of ammonia slip (emission);
- A limestone injection system to limit emissions of SO_2;
- A reverse air baghouse to control opacity and emissions of sulfates and particulate to very low levels;
- A hydrated lime injection system to limit emissions of HCL.

The plant CEMS system for each unit includes measurements of NO_x, O_2, O_2 wet, CO_2, CO, SO_2, flow and opacity. It is an extractive system with a heated line extending from the probe to the CEMS unit. Table 2-1 presents the current CEMS configuration.

TABLE 2-1
CONTINUOUS EMISSION MONITOR SYSTEM
UNITS 1 AND 2
DESERT VIEW POWER

Species	Manufacturer	Unit 1, Model/Serial Number	Unit 2, Model/Serial Number	Range
NO_x	CAI	ZRE/A3F4992T	ZRE/A3F4993T	100 and 500 ppm
O_2 Dry	CAI	ZRE/A3F4992T	ZRE/A3F4993T	25%
O_2 Wet	Thermox	WDG	WDG	25%
CO_2	CAI	ZRE/A3F4992T	ZRE/A3F4993T	20%
CO	CAI	ZRE/A3F4992T	ZRE/A3F4993T	100 and 500 ppm
SO_2	CAI	ZRE/A3F4992T	ZRE/A3F4993T	50 and 500 ppm
Flow	Dietrick Standard/Rosemont	0260938	--	Msdcfh
Opacity	Monitor Labs	Lighthawk 560	Lighthawk 560	100%
NO_2 Convertor	CAI	ZDL04001	ZDL04001	

2.1 TEST CONDITIONS

The tests were conducted at or near maximum steady state unit load conditions. Limestone injection rate, fuel combustion rate, ammonia injection rate, ash handling operations, excess air level, combustion air distribution, and combustor temperature were set to maintain stable unit operation. Pertinent operating conditions were recorded by Desert View Power personnel during the tests as presented in Table 2-2.

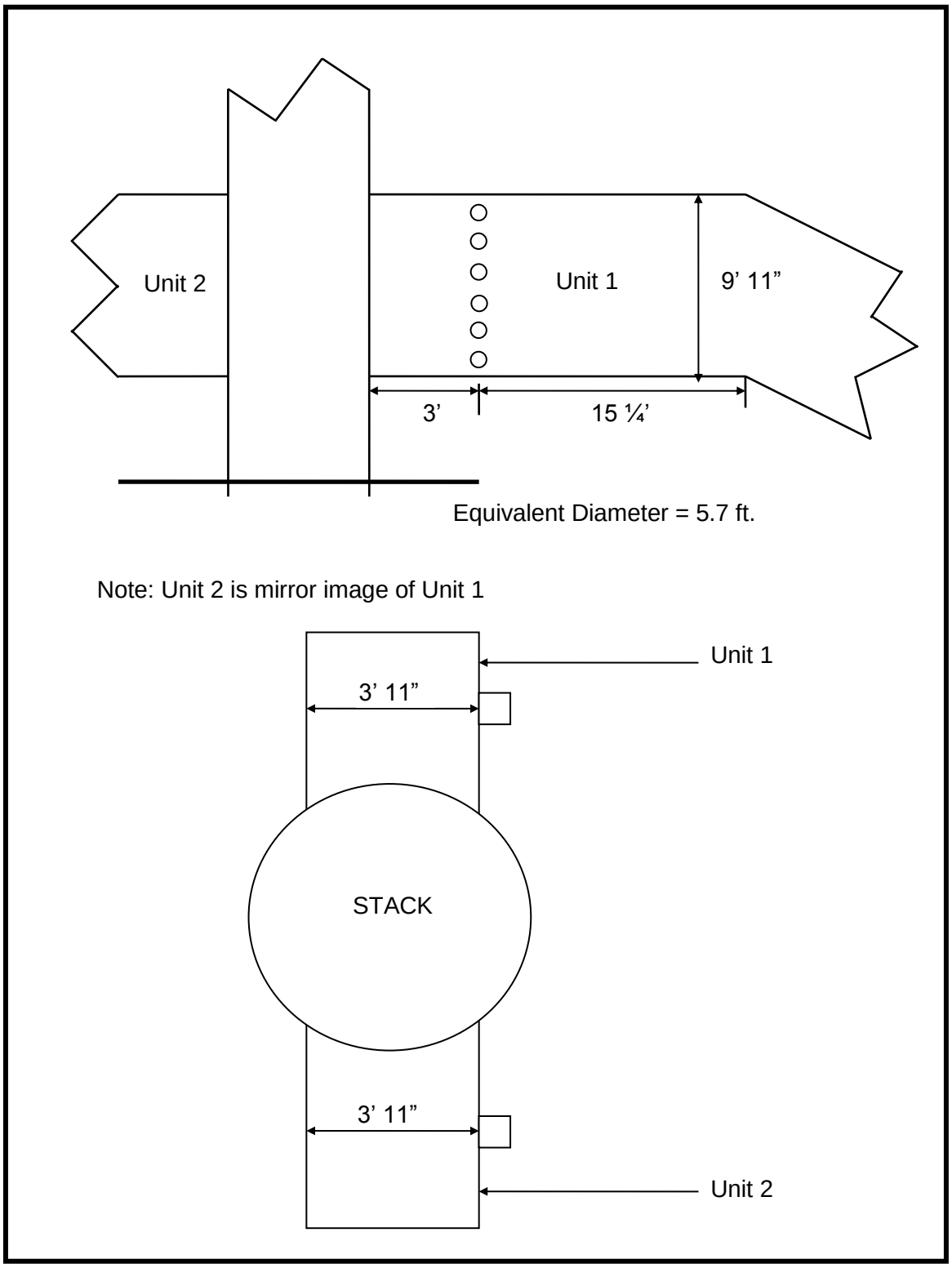
TABLE 2-2
AVERAGE DAILY UNIT DATA
DESERT VIEW POWER
SEPTEMBER 9 AND 10, 2020

Date	Unit No.	Steam Flow kpph	Boiler Input MMBtu/hr
9/10/2020	1	208	383
9/9/2020	2	208	372

2.2 SAMPLE LOCATIONS

Samples were collected at the stack breaching ducts to the stack. Desert View Power previously conducted three dimensional flow testing and stratification testing on the baghouse exhaust ducts on each unit. This testing was performed in accordance to SCAQMD Chapter X, Section 1 and 13 and was presented in the report titled "Stack Gas Stratification and Absence of Flow Disturbance Testing at Desert View Power" (R106E622.T) submitted to SCAQMD in October of 1994. A copy of the sample location certification report can be found in the test plan in Appendix E of this report. The sample locations meet the requirements. All testing for both Unit 1 and 2 was conducted at the sample location presented in Figure 2-1.

FIGURE 2-1
SCHEMATIC OF THE DESERT VIEW POWER, SAMPLE LOCATION



3.0 TEST DESCRIPTIONS

The test procedures that were used are listed in Table 3-1. Tables 3-2 and 3-3 present the test schedule.

TABLE 3-1
TEST MATRIX PER UNIT
DESERT VIEW POWER

Parameter	No. of Tests	Measurement Principle	Reference Method	Duration per Test
O_2	3	Paramagnetic	EPA 3A	120 minutes
HCL	3	Ion Chromatography	EPA 26A	120 minutes, minimum of 2 DSCM of sample volume
Stack Gas Flow Rate	--	S-Type Pitot Traverse	EPA 2	--
Moisture	--	Condensation/Gravimetric	EPA 4	--

TABLE 3-2
TEST SCHEDULE UNIT 1
DESERT VIEW POWER

Test No.	Date	Time	Test Parameter
1-HCL-U1	9/10/2020	553/758	HCL
2-HCL-U1	9/10/2020	822/1027	HCL
3-HCL-U1	9/10/2020	1230/1435	HCL

TABLE 3-3
TEST SCHEDULE UNIT 2
DESERT VIEW POWER

Test No.	Date	Time	Test Parameter
1-HCL-U2	9/9/2020	810/1016	HCL
2-HCL-U2	9/9/2020	1030/1235	HCL
3-HCL-U2	9/9/2020	1247/1452	HCL

3.1 O_2, AND CO_2

O_2 and CO_2 were measured according to EPA reference methods using MAQS' continuous emissions monitoring system (CEM). O_2 and CO_2 concentrations were determined using MAQS' mobile emission measurement laboratory. The laboratory is housed in a truck outfitted to provide a clean, quiet, environmentally controlled base for the testing operations. The laboratory has lighting, electrical distribution, air conditioning and heating to support the test instruments and provide for optimal test performance.

Concentrations of these gaseous species were measured using an extractive sampling system consisting of a stainless steel probe to minimize reactions, a heat traced Teflon sample line connected to a thermo-electrically cooled sample dryer. Following the dryer, the sample is drawn into a Teflon lined pump where it is pressurized and then filtered for delivery to the gas analysis portion of the system. Gaseous samples were collected at a single point. Three 60-minute compliance tests were performed.

Oxygen concentration was determined using an CAI Series 700 paramagnetic analyzer. The analyzer full scale range was 20%. The cell contains an electrolytic fluid that reacts with oxygen to generate an electrical signal proportional to the concentration.

CO_2 was measured using a non-dispersive infrared analyzer manufactured by Horiba (model #PIR 2000). The analyzer full scale range was 20%.

The analyzers and sampling system were subjected to a variety of calibration and quality assurance procedures including leak checks, linearity and calibration error determinations before sampling, and system bias and drift determinations as part of each test run. Data are corrected for any observed bias or drift in accordance with the reference methods.

3.2 HYDROGEN CHLORIDE MEASUREMENTS

Triplicate hydrogen chloride (HCl), samples were collected using EPA Method 26A. Sampling and analysis for HF and Cl_2 which is included in EPA Method 26A was not performed.

The sampling train consists of:

- A glass nozzle and heated glass probe heated to between 248°F and 273°F
- A Teflon Mat out-of-stack filter in a glass filter holder heated to 248°F ± 25°F
- Two impingers containing 100 ml of 0.1 N H_2SO_4 for collection of HCl
- One empty impinger
- An impinger containing silica gel

Samples are withdrawn isokinetically from the stack. The Teflon Mat filter collects particulate matter. The acidic absorbing solution collect gaseous HCl and is analyzed for HCl by ion chromatography.

The samples are recovered in the following sample fraction:

- Back half of filter holder, H_2SO_4 Impinger Catch – Weighed for moisture content and recovered with DI water into pre-cleaned HDPE bottle.

The filter and probe wash were not recovered for this test program.

Quality assurance samples collected in the field are:

- A field blank
- A reagent blank: 200 ml of 0.1 N H_2SO_4
- A reagent blank: 200 ml of DI water

The samples were analyzed by ion chromatography by AAC in Ventura.

3.3 VELOCITY AND MOISTURE

Stack gas velocity and moisture content were determined by EPA Methods 2 and 4 during the HCL testing.

3.4 FUEL ANALYSIS

Daily fuel samples were collected by Desert View Power personnel. Hourly samples were taken during each HCl test run and composited by the lab prior to analysis. Sampling was consistent with ASTM D6323 sample collection methodology. Desert View power sent the samples out to be analyzed for higher heating value for heat rate calculations, for Btu/lb for calculating the HCL emissions in lb/MMBtu using ASTM E711, for moisture content using ASTM D3173 and for chlorine content using ASTM E776. Copies of the analysis can be found in the appendices.

4.0 TEST RESULTS

This section presents the results of the performance tests conducted at Desert View Power, during June of 2020. Test results are presented in the following sections:

4.1 Unit 1 Performance Test Results
4.2 Unit 2 Performance Test Results
4.3 Fuel Analysis Results

All supporting data sheets, CEM data, instrument strip charts, laboratory data, chain of custody records, and quality assurance data are included in Appendix A. Plant data are contained in Appendix B. Emissions and Load calculations are presented in Appendix C. Quality assurance information is contained in Appendix D. The test plan that was submitted is contained in Appendix E.

4.1 UNIT 1 PERFORMANCE TEST RESULTS

The results of the HCL testing are presented in Table 4-1. HCL emissions for Unit 1 were 0.016 lb/MMBtu. This is within the permit limit of 0.022 lb/MMBtu.

TABLE 4-1
HYDROCHLORIC ACID TEST RESULTS UNIT 1
DESERT VIEW POWER
SEPTEMBER 10, 2020

Parameter/Units	1-HCL-U1	2-HCL-U1	3-HCL-U1	Average	Limit
Date	09/10/2020	09/10/2020	09/10/2020		
Start/Stop Time	553/758	822/1027	1230/1435		
Stack Flow Rate, dscfm	91,227	90,308	89,830	90,455	
Sample Volume, dscf	75.160	75.081	74.543	74.928	
O_2, %	8.41	8.40	8.34	8.38	
CO_2, %	12.05	12.07	12.10	12.08	
HCl					
mg/sample	39.4	39.4	35.3	38.0	
mg/dscm	18.51	18.53	16.72	17.92	
ppm (as HCl)	12.20	12.21	11.02	11.81	
lb/hr (as HCl)	6.32	6.26	5.62	6.07	
MMBtu/Hr	383	383	383	383	
lb/MMBtu	0.017	0.016	0.015	0.016	0.022

4.2 UNIT 2 PERFORMANCE TEST RESULTS

The results of the HCL testing are presented in Table 4-2. HCL emissions for Unit 2 were 0.022 lb/MMBtu. This is within the permit limit of 0.022 lb/MMBtu.

TABLE 4-2
HYDROCHLORIC ACID TEST RESULTS UNIT 2
DESERT VIEW POWER
SEPTEMBER 9, 2020

Parameter/Units	1-HCL-U2	2-HCL-U2	3-HCL-U2	Average	Limit
Date	9/9/202020	9/9/202020	9/9/202020		
Start/Stop Time	810/1016	1030/1235	1247/1452		
Stack Flow Rate, dscfm	91,692	92,099	91,787	91,859	
Sample Volume, dscf	75.761	76.799	76.385	76.315	
O_2, %	8.66	8.56	8.63	8.61	
CO_2, %	11.79	11.86	11.80	11.82	
HCl					
mg/sample	54.0	44.3	57.2	51.8	
mg/dscm	25.17	20.37	26.44	23.99	
ppm (as HCl)	16.59	13.43	17.43	15.82	
lb/hr (as HCl)	8.64	7.02	9.08	8.25	
MMBtu/Hr	372	372	372	372	
lb/MMBtu	0.023	0.019	0.024	0.022	0.022

4.3 FUEL ANALYSIS

The fuel sample analysis results are presented in Appendix A.3.2.

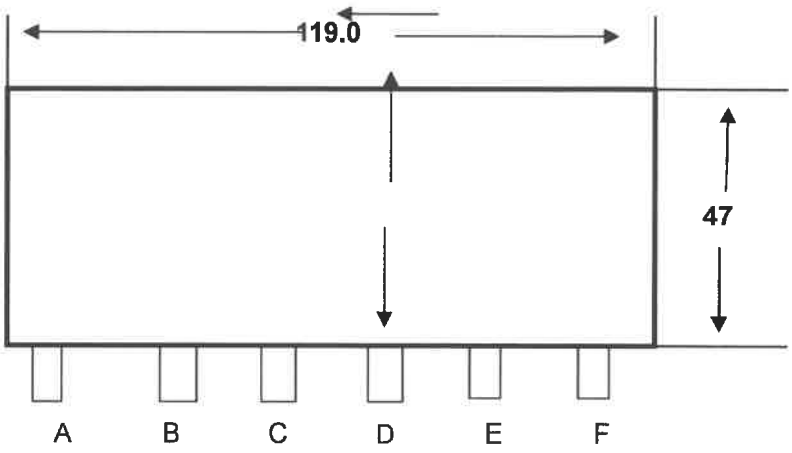
APPENDIX A
TEST DATA

Appendix A.1
Unit 1 Data

Appendix A.1.1
Unit 1 Sample Location

Client: Desert View Power Date: 9/10/2020

Sample Location: Unit 1-2 Prepared By: Dave Wonderly



H (in.)	**119.0**
W (in.)	**47.0**
Nipple length	**13.0**
Distance between points	**9.40**
Stack Area (ft^2)	**38.84**

Point No.	Sample Point	
1	4.7	17.7
2	14.1	27.1
3	23.5	36.5
4	32.9	45.9
5	42.3	55.3

Appendix A.1.2
Unit 1 CEM Data

Date	Time	O2 %	CO2 %	
9/10/2020	4:26	0.00	0.02	
9/10/2020	4:27	15.77	14.95	
9/10/2020	4:28	19.21	18.92	
9/10/2020	4:29	19.21	18.93	
9/10/2020	4:30	19.16	18.92	
9/10/2020	4:31	19.14	18.92	High
9/10/2020	4:32	14.93	14.49	
9/10/2020	4:33	10.51	10.57	
9/10/2020	4:34	10.51	10.57	Mid
9/10/2020	4:35	2.62	2.47	
9/10/2020	4:36	0.00	0.02	Zero
9/10/2020	4:37	4.83	7.60	
9/10/2020	4:38	8.64	11.84	
9/10/2020	4:39	8.50	11.91	
9/10/2020	4:40	8.82	11.68	
9/10/2020	4:41	8.12	12.44	
9/10/2020	4:42	8.17	12.17	
9/10/2020	4:43	9.27	11.27	
9/10/2020	4:44	8.47	12.02	
9/10/2020	4:45	8.44	12.05	
9/10/2020	4:46	8.28	12.23	
9/10/2020	4:47	8.91	11.54	
9/10/2020	4:48	7.79	12.71	
9/10/2020	4:49	8.50	11.97	
9/10/2020	4:50	8.10	12.40	
9/10/2020	4:51	8.73	11.76	
9/10/2020	4:52	7.56	12.84	
9/10/2020	4:53	8.87	11.71	
9/10/2020	4:54	8.20	12.29	
9/10/2020	4:55	8.15	12.38	
9/10/2020	4:56	9.14	11.43	
9/10/2020	4:57	9.02	11.46	
9/10/2020	4:58	8.85	11.71	
9/10/2020	4:59	8.66	11.80	
9/10/2020	5:00	8.59	11.95	
9/10/2020	5:01	8.24	12.34	
9/10/2020	5:02	8.25	12.26	
9/10/2020	5:03	8.15	12.41	
9/10/2020	5:04	7.40	13.07	
9/10/2020	5:05	7.84	12.71	
9/10/2020	5:06	8.44	11.99	
9/10/2020	5:07	8.69	11.79	
9/10/2020	5:08	8.20	12.38	
9/10/2020	5:09	8.81	11.72	
9/10/2020	5:10	8.57	11.90	

9/10/2020	5:11	8.57	12.02	
9/10/2020	5:12	8.45	12.07	
9/10/2020	5:13	8.59	11.93	
9/10/2020	5:14	8.43	12.11	
9/10/2020	5:15	8.20	12.30	
9/10/2020	5:16	8.13	12.57	
9/10/2020	5:17	7.69	12.71	
9/10/2020	5:18	9.08	11.56	
9/10/2020	5:19	8.11	12.44	
9/10/2020	5:20	7.61	12.88	
9/10/2020	5:21	8.87	11.61	
9/10/2020	5:22	8.27	12.33	
9/10/2020	5:23	8.15	12.27	
9/10/2020	5:24	8.87	11.64	
9/10/2020	5:25	8.79	11.75	
9/10/2020	5:26	8.67	11.94	
9/10/2020	5:27	8.28	12.14	
9/10/2020	5:28	9.07	11.51	
9/10/2020	5:29	8.51	12.04	
9/10/2020	5:30	7.40	13.16	
9/10/2020	5:31	8.44	11.94	
9/10/2020	5:32	8.16	12.43	
9/10/2020	5:33	9.19	11.23	
9/10/2020	5:34	9.71	10.73	
9/10/2020	5:35	10.48	10.54	
9/10/2020	5:36	10.48	10.56	O2 CO2 Bias
9/10/2020	5:37	5.34	4.75	
9/10/2020	5:38	0.03	0.06	Zero Bias
9/10/2020	5:39	4.06	5.86	
9/10/2020	5:40	9.01	11.44	
9/10/2020	5:41	9.11	11.41	
9/10/2020	5:42	8.49	12.15	
9/10/2020	5:43	8.57	11.82	
9/10/2020	5:44	8.53	12.08	
9/10/2020	5:45	8.22	12.25	
9/10/2020	5:46	8.29	12.22	
9/10/2020	5:47	8.67	11.78	
9/10/2020	5:48	8.79	11.70	
9/10/2020	5:49	8.03	12.58	
9/10/2020	5:50	7.99	12.61	
9/10/2020	5:51	7.79	12.60	
9/10/2020	5:52	9.12	11.36	
9/10/2020	5:53	8.42	12.06	
9/10/2020	5:54	8.37	12.26	
9/10/2020	5:55	8.59	11.72	
9/10/2020	5:56	9.15	11.43	
9/10/2020	5:57	8.55	11.97	

9/10/2020	5:58	8.61	11.89
9/10/2020	5:59	8.37	12.18
9/10/2020	6:00	7.93	12.67
9/10/2020	6:01	7.11	13.33
9/10/2020	6:02	7.86	12.55
9/10/2020	6:03	8.90	11.58
9/10/2020	6:04	9.42	11.02
9/10/2020	6:05	8.76	11.89
9/10/2020	6:06	8.62	11.86
9/10/2020	6:07	8.45	12.01
9/10/2020	6:08	6.95	13.69
9/10/2020	6:09	8.16	12.30
9/10/2020	6:10	8.63	11.77
9/10/2020	6:11	8.25	12.16
9/10/2020	6:12	8.42	12.10
9/10/2020	6:13	8.20	12.42
9/10/2020	6:14	7.46	12.90
9/10/2020	6:15	8.22	12.23
9/10/2020	6:16	8.47	12.16
9/10/2020	6:17	8.29	12.20
9/10/2020	6:18	8.45	12.06
9/10/2020	6:19	7.82	12.72
9/10/2020	6:20	8.19	12.24
9/10/2020	6:21	8.16	12.36
9/10/2020	6:22	6.67	13.81
9/10/2020	6:23	8.07	12.32
9/10/2020	6:24	9.34	11.18
9/10/2020	6:25	8.22	12.28
9/10/2020	6:26	8.82	11.74
9/10/2020	6:27	7.91	12.51
9/10/2020	6:28	8.66	11.81
9/10/2020	6:29	8.16	12.41
9/10/2020	6:30	8.09	12.37
9/10/2020	6:31	8.52	11.88
9/10/2020	6:32	8.99	11.51
9/10/2020	6:33	8.00	12.58
9/10/2020	6:34	7.95	12.47
9/10/2020	6:35	8.27	12.18
9/10/2020	6:36	9.01	11.37
9/10/2020	6:37	8.43	12.12
9/10/2020	6:38	9.01	11.38
9/10/2020	6:39	8.59	11.94
9/10/2020	6:40	8.50	11.99
9/10/2020	6:41	8.87	11.52
9/10/2020	6:42	8.38	12.17
9/10/2020	6:43	7.75	12.62
9/10/2020	6:44	8.81	11.68

9/10/2020	6:45	8.55	11.95
9/10/2020	6:46	8.71	11.68
9/10/2020	6:47	8.48	12.08
9/10/2020	6:48	8.53	11.79
9/10/2020	6:49	8.74	11.81
9/10/2020	6:50	7.70	12.79
9/10/2020	6:51	8.19	12.27
9/10/2020	6:52	8.67	11.83
9/10/2020	6:53	7.88	12.54
9/10/2020	6:54	7.77	12.67
9/10/2020	6:55	8.53	12.02
9/10/2020	6:56	8.71	11.69
9/10/2020	6:57	9.16	11.34
9/10/2020	6:58	8.21	12.26
9/10/2020	6:59	8.89	11.61
9/10/2020	7:00	7.88	12.51
9/10/2020	7:01	8.80	11.66
9/10/2020	7:02	8.91	11.65
9/10/2020	7:03	8.15	12.28
9/10/2020	7:04	8.68	11.78
9/10/2020	7:05	8.79	11.70
9/10/2020	7:06	8.89	11.59
9/10/2020	7:07	8.65	11.83
9/10/2020	7:08	8.57	11.95
9/10/2020	7:09	8.64	11.81
9/10/2020	7:10	8.22	12.41
9/10/2020	7:11	7.75	12.60
9/10/2020	7:12	8.03	12.45
9/10/2020	7:13	8.05	12.51
9/10/2020	7:14	9.49	10.93
9/10/2020	7:15	8.68	11.85
9/10/2020	7:16	8.30	12.26
9/10/2020	7:17	8.20	12.32
9/10/2020	7:18	9.14	11.28
9/10/2020	7:19	8.84	11.83
9/10/2020	7:20	8.54	11.99
9/10/2020	7:21	8.54	12.00
9/10/2020	7:22	8.53	12.00
9/10/2020	7:23	8.05	12.49
9/10/2020	7:24	7.84	12.57
9/10/2020	7:25	9.24	11.19
9/10/2020	7:26	9.48	11.00
9/10/2020	7:27	8.98	11.59
9/10/2020	7:28	8.37	12.20
9/10/2020	7:29	7.66	12.92
9/10/2020	7:30	8.37	12.01
9/10/2020	7:31	8.42	12.12

9/10/2020	7:32	7.61	12.88	
9/10/2020	7:33	9.31	11.07	
9/10/2020	7:34	8.70	11.78	
9/10/2020	7:35	7.77	12.90	
9/10/2020	7:36	7.93	12.54	
9/10/2020	7:37	8.09	12.32	
9/10/2020	7:38	8.21	12.29	
9/10/2020	7:39	8.16	12.32	
9/10/2020	7:40	8.73	11.78	
9/10/2020	7:41	7.67	12.84	
9/10/2020	7:42	8.09	12.44	
9/10/2020	7:43	7.96	12.31	
9/10/2020	7:44	9.89	10.66	
9/10/2020	7:45	8.89	11.64	
9/10/2020	7:46	9.31	11.25	
9/10/2020	7:47	8.79	11.78	
9/10/2020	7:48	8.87	11.68	
9/10/2020	7:49	7.54	13.04	
9/10/2020	7:50	7.76	12.71	
9/10/2020	7:51	8.26	12.15	
9/10/2020	7:52	8.39	12.24	
9/10/2020	7:53	7.94	12.55	
9/10/2020	7:54	8.44	12.04	
9/10/2020	7:55	8.30	12.35	
9/10/2020	7:56	8.66	11.74	
9/10/2020	7:57	9.20	11.33	
9/10/2020	7:58	7.73	12.79	
Run 1 Average		8.41	12.08	
9/10/2020	7:59	1.29	0.88	
9/10/2020	8:00	0.05	0.05	Zero Bias
9/10/2020	8:01	6.58	7.01	
9/10/2020	8:02	10.46	10.48	O2 CO2 Bias
9/10/2020	8:03	1.50	1.67	
9/10/2020	8:04	0.00	0.02	Zero
9/10/2020	8:05	7.59	7.85	
9/10/2020	8:06	10.50	10.56	
9/10/2020	8:07	10.51	10.56	Span
9/10/2020	8:08	10.50	10.56	
9/10/2020	8:09	9.07	11.72	
9/10/2020	8:10	8.24	12.08	
9/10/2020	8:11	8.52	12.02	
9/10/2020	8:12	8.42	11.97	
9/10/2020	8:13	9.25	11.21	
9/10/2020	8:14	9.23	11.28	
9/10/2020	8:15	8.53	11.95	
9/10/2020	8:16	8.62	11.80	
9/10/2020	8:17	8.57	11.87	

9/10/2020	8:18	8.14	12.41
9/10/2020	8:19	7.80	12.69
9/10/2020	8:20	7.93	12.32
9/10/2020	8:21	9.05	11.52
9/10/2020	8:22	7.62	12.71
9/10/2020	8:23	8.11	12.39
9/10/2020	8:24	8.28	12.06
9/10/2020	8:25	9.45	11.04
9/10/2020	8:26	8.10	12.44
9/10/2020	8:27	8.22	12.20
9/10/2020	8:28	7.45	12.99
9/10/2020	8:29	8.19	12.24
9/10/2020	8:30	8.38	11.93
9/10/2020	8:31	9.05	11.38
9/10/2020	8:32	8.15	12.34
9/10/2020	8:33	8.16	12.33
9/10/2020	8:34	7.50	12.91
9/10/2020	8:35	9.11	11.17
9/10/2020	8:36	9.11	11.37
9/10/2020	8:37	8.10	12.41
9/10/2020	8:38	9.07	11.38
9/10/2020	8:39	7.48	12.86
9/10/2020	8:40	9.07	11.31
9/10/2020	8:41	8.97	11.61
9/10/2020	8:42	7.82	12.63
9/10/2020	8:43	7.45	13.00
9/10/2020	8:44	8.66	11.74
9/10/2020	8:45	8.69	11.79
9/10/2020	8:46	8.21	12.30
9/10/2020	8:47	8.09	12.37
9/10/2020	8:48	8.63	11.74
9/10/2020	8:49	8.15	12.32
9/10/2020	8:50	7.74	12.75
9/10/2020	8:51	8.45	11.96
9/10/2020	8:52	8.47	11.98
9/10/2020	8:53	8.79	11.67
9/10/2020	8:54	9.06	11.54
9/10/2020	8:55	7.98	12.47
9/10/2020	8:56	7.21	13.18
9/10/2020	8:57	7.41	13.14
9/10/2020	8:58	8.23	12.24
9/10/2020	8:59	8.86	11.55
9/10/2020	9:00	8.83	11.71
9/10/2020	9:01	9.24	11.24
9/10/2020	9:02	8.16	12.42
9/10/2020	9:03	7.80	12.59
9/10/2020	9:04	8.95	11.46

9/10/2020	9:05	8.68	11.96
9/10/2020	9:06	8.33	12.22
9/10/2020	9:07	7.84	12.65
9/10/2020	9:08	8.98	11.46
9/10/2020	9:09	8.79	11.79
9/10/2020	9:10	9.06	11.41
9/10/2020	9:11	8.88	11.60
9/10/2020	9:12	8.14	12.44
9/10/2020	9:13	8.19	12.27
9/10/2020	9:14	8.38	12.04
9/10/2020	9:15	8.94	11.57
9/10/2020	9:16	8.52	12.00
9/10/2020	9:17	7.60	12.93
9/10/2020	9:18	7.94	12.46
9/10/2020	9:19	8.97	11.52
9/10/2020	9:20	8.26	12.27
9/10/2020	9:21	8.85	11.63
9/10/2020	9:22	8.31	12.23
9/10/2020	9:23	8.15	12.33
9/10/2020	9:24	8.65	11.86
9/10/2020	9:25	8.64	11.81
9/10/2020	9:26	8.26	12.26
9/10/2020	9:27	8.40	12.08
9/10/2020	9:28	8.53	11.92
9/10/2020	9:29	9.39	11.12
9/10/2020	9:30	8.36	12.13
9/10/2020	9:31	7.78	12.73
9/10/2020	9:32	8.25	12.15
9/10/2020	9:33	8.66	11.92
9/10/2020	9:34	7.88	12.51
9/10/2020	9:35	8.29	12.18
9/10/2020	9:36	8.37	12.16
9/10/2020	9:37	7.95	12.57
9/10/2020	9:38	8.05	12.32
9/10/2020	9:39	6.94	13.52
9/10/2020	9:40	6.97	13.64
9/10/2020	9:41	8.16	12.12
9/10/2020	9:42	8.70	11.87
9/10/2020	9:43	8.07	12.36
9/10/2020	9:44	8.46	11.99
9/10/2020	9:45	8.47	11.97
9/10/2020	9:46	8.92	11.61
9/10/2020	9:47	8.76	11.61
9/10/2020	9:48	8.49	11.98
9/10/2020	9:49	7.48	13.03
9/10/2020	9:50	8.06	12.45
9/10/2020	9:51	8.48	11.85

9/10/2020	9:52	9.14	11.34	
9/10/2020	9:53	7.81	12.73	
9/10/2020	9:54	7.42	13.00	
9/10/2020	9:55	9.03	11.31	
9/10/2020	9:56	9.45	11.07	
9/10/2020	9:57	9.13	11.29	
9/10/2020	9:58	9.05	11.50	
9/10/2020	9:59	8.11	12.41	
9/10/2020	10:00	8.00	12.46	
9/10/2020	10:01	8.44	11.91	
9/10/2020	10:02	8.53	12.01	
9/10/2020	10:03	8.60	11.87	
9/10/2020	10:04	8.66	11.81	
9/10/2020	10:05	8.38	12.08	
9/10/2020	10:06	8.01	12.55	
9/10/2020	10:07	8.30	12.00	
9/10/2020	10:08	9.01	11.46	
9/10/2020	10:09	8.47	12.04	
9/10/2020	10:10	8.02	12.48	
9/10/2020	10:11	8.18	12.24	
9/10/2020	10:12	8.67	11.81	
9/10/2020	10:13	8.18	12.35	
9/10/2020	10:14	8.11	12.31	
9/10/2020	10:15	7.76	12.72	
9/10/2020	10:16	7.46	13.06	
9/10/2020	10:17	7.36	12.96	
9/10/2020	10:18	8.93	11.48	
9/10/2020	10:19	9.60	10.77	
9/10/2020	10:20	9.09	11.40	
9/10/2020	10:21	9.51	10.84	
9/10/2020	10:22	9.67	10.78	
9/10/2020	10:23	8.22	12.20	
9/10/2020	10:24	7.86	12.72	
9/10/2020	10:25	8.01	12.38	
9/10/2020	10:26	7.72	12.76	
9/10/2020	10:27	7.93	12.48	
Run 2 Average		8.37	12.09	
9/10/2020	10:28	7.57	11.79	
9/10/2020	10:29	8.19	12.13	Zero Bias
9/10/2020	10:30	8.27	10.77	
9/10/2020	10:31	10.41	10.53	O2 CO2 Bias
9/10/2020	10:32	4.06	3.49	
9/10/2020	10:33	0.04	0.06	Zero Bias
9/10/2020	10:34	8.99	9.13	
9/10/2020	10:35	10.44	10.60	Span
9/10/2020	10:36	3.10	3.02	
9/10/2020	10:37	-0.01	0.02	Zero

9/10/2020	10:38	5.22	8.96
9/10/2020	10:39	8.20	12.23
9/10/2020	10:40	8.30	12.01
9/10/2020	10:41	8.65	11.65
9/10/2020	10:42	8.90	11.49
9/10/2020	10:43	8.68	11.71
9/10/2020	10:44	8.34	12.15
9/10/2020	10:45	8.40	11.92
9/10/2020	10:46	8.47	11.88
9/10/2020	10:47	8.35	12.04
9/10/2020	10:48	8.42	11.96
9/10/2020	10:49	8.85	11.54
9/10/2020	10:50	8.16	12.23
9/10/2020	10:51	8.57	11.88
9/10/2020	10:52	8.71	11.68
9/10/2020	10:53	9.44	10.98
9/10/2020	10:54	7.09	13.45
9/10/2020	10:55	6.65	13.66
9/10/2020	10:56	8.25	11.96
9/10/2020	10:57	8.63	11.92
9/10/2020	10:58	7.81	12.63
9/10/2020	10:59	8.72	11.56
9/10/2020	11:00	9.04	11.37
9/10/2020	11:01	9.07	11.29
9/10/2020	11:02	8.48	12.05
9/10/2020	11:03	7.58	12.77
9/10/2020	11:04	7.66	12.79
9/10/2020	11:05	8.07	12.28
9/10/2020	11:06	8.20	12.19
9/10/2020	11:07	7.80	12.56
9/10/2020	11:08	8.05	12.36
9/10/2020	11:09	7.89	12.50
9/10/2020	11:10	8.19	12.15
9/10/2020	11:11	8.96	11.41
9/10/2020	11:12	8.51	11.90
9/10/2020	11:13	8.62	11.67
9/10/2020	11:14	8.37	12.18
9/10/2020	11:15	7.42	12.99
9/10/2020	11:16	8.17	12.03
9/10/2020	11:17	8.25	12.19
9/10/2020	11:18	7.64	12.93
9/10/2020	11:19	7.70	12.55
9/10/2020	11:20	8.28	12.18
9/10/2020	11:21	7.53	12.86
9/10/2020	11:22	8.65	11.59
9/10/2020	11:23	8.31	12.17
9/10/2020	11:24	8.07	12.24

9/10/2020	11:25	8.33	12.14	
9/10/2020	11:26	7.94	12.28	
9/10/2020	11:27	8.64	11.69	
9/10/2020	11:28	8.11	12.20	
9/10/2020	11:29	8.00	12.52	
9/10/2020	11:30	9.08	11.20	
9/10/2020	11:31	8.51	12.04	
9/10/2020	11:32	7.17	13.02	
9/10/2020	11:33	8.77	11.38	
9/10/2020	11:34	8.59	12.00	
9/10/2020	11:35	8.03	12.36	
9/10/2020	11:36	8.85	11.33	
9/10/2020	11:37	9.12	10.16	
9/10/2020	11:38	10.34	10.51	O2 CO2 Bias
9/10/2020	11:39	4.86	4.05	
9/10/2020	11:40	0.04	0.06	Zero Bias
9/10/2020	11:41	4.37	6.58	
9/10/2020	11:42	8.12	12.25	
9/10/2020	11:43	7.82	12.46	
9/10/2020	11:44	8.70	11.73	
9/10/2020	11:45	8.75	11.55	
9/10/2020	11:46	9.01	11.32	
9/10/2020	11:47	8.51	11.84	
9/10/2020	11:48	8.02	12.49	
9/10/2020	11:49	9.14	11.20	
9/10/2020	11:50	7.89	12.55	
9/10/2020	11:51	8.01	12.24	
9/10/2020	11:52	7.34	12.96	
9/10/2020	11:53	9.22	11.13	
9/10/2020	11:54	7.97	12.45	
9/10/2020	11:55	7.94	12.24	
9/10/2020	11:56	8.69	11.66	
9/10/2020	11:57	8.54	11.91	
9/10/2020	11:58	8.99	11.19	
9/10/2020	11:59	9.49	10.82	
9/10/2020	12:00	8.09	12.37	
9/10/2020	12:01	7.03	13.55	
9/10/2020	12:02	7.45	12.66	
9/10/2020	12:03	7.86	12.54	
9/10/2020	12:04	8.44	11.79	
9/10/2020	12:05	8.56	11.72	
9/10/2020	12:06	9.52	10.96	
9/10/2020	12:07	8.38	11.76	
9/10/2020	12:08	7.34	13.20	
9/10/2020	12:09	8.77	11.38	
9/10/2020	12:10	9.26	11.08	
9/10/2020	12:11	9.93	10.41	

9/10/2020	12:12	8.49	12.03	
9/10/2020	12:13	6.94	13.41	
9/10/2020	12:14	7.22	13.14	
9/10/2020	12:15	8.07	12.16	
9/10/2020	12:16	8.52	11.62	
9/10/2020	12:17	8.98	11.59	
9/10/2020	12:18	7.91	12.51	
9/10/2020	12:19	7.63	12.68	
9/10/2020	12:20	7.66	12.69	
9/10/2020	12:21	7.37	13.16	
9/10/2020	12:22	7.53	12.73	
9/10/2020	12:23	7.91	12.47	
9/10/2020	12:24	8.65	11.68	
9/10/2020	12:25	7.58	11.60	
9/10/2020	12:26	10.10	10.46	
9/10/2020	12:27	10.31	10.50	O2 CO2 Bias
9/10/2020	12:28	3.25	2.42	
9/10/2020	12:29	0.03	0.05	Zero Bias
9/10/2020	12:30	2.17	5.03	
9/10/2020	12:31	7.97	12.45	
9/10/2020	12:32	7.66	12.68	
9/10/2020	12:33	7.78	12.55	
9/10/2020	12:34	8.70	11.74	
9/10/2020	12:35	9.97	10.28	
9/10/2020	12:36	8.14	12.33	
9/10/2020	12:37	7.43	12.86	
9/10/2020	12:38	8.78	11.71	
9/10/2020	12:39	8.56	11.58	
9/10/2020	12:40	8.68	11.85	
9/10/2020	12:41	7.95	12.38	
9/10/2020	12:42	7.86	12.54	
9/10/2020	12:43	7.42	12.97	
9/10/2020	12:44	7.23	13.15	
9/10/2020	12:45	8.22	12.14	
9/10/2020	12:46	8.67	11.49	
9/10/2020	12:47	9.25	11.08	
9/10/2020	12:48	8.81	11.39	
9/10/2020	12:49	8.80	11.70	
9/10/2020	12:50	8.29	12.09	
9/10/2020	12:51	7.96	12.39	
9/10/2020	12:52	7.68	12.58	
9/10/2020	12:53	8.39	11.97	
9/10/2020	12:54	8.28	12.07	
9/10/2020	12:55	7.99	12.36	
9/10/2020	12:56	8.58	11.63	
9/10/2020	12:57	8.46	11.87	
9/10/2020	12:58	8.35	11.93	

9/10/2020	12:59	8.30	12.01
9/10/2020	13:00	8.12	12.19
9/10/2020	13:01	8.19	12.18
9/10/2020	13:02	6.97	13.28
9/10/2020	13:03	8.09	12.13
9/10/2020	13:04	8.30	11.93
9/10/2020	13:05	8.43	11.95
9/10/2020	13:06	8.05	12.19
9/10/2020	13:07	7.93	12.26
9/10/2020	13:08	7.68	12.71
9/10/2020	13:09	7.35	12.95
9/10/2020	13:10	7.88	12.34
9/10/2020	13:11	8.66	11.60
9/10/2020	13:12	9.08	11.13
9/10/2020	13:13	7.79	12.67
9/10/2020	13:14	8.29	11.91
9/10/2020	13:15	7.67	12.55
9/10/2020	13:16	7.76	12.53
9/10/2020	13:17	7.87	12.46
9/10/2020	13:18	7.99	12.30
9/10/2020	13:19	8.62	11.46
9/10/2020	13:20	8.49	11.76
9/10/2020	13:21	9.11	11.21
9/10/2020	13:22	8.51	11.77
9/10/2020	13:23	7.50	12.80
9/10/2020	13:24	8.06	12.07
9/10/2020	13:25	8.74	11.63
9/10/2020	13:26	7.42	12.85
9/10/2020	13:27	8.80	11.27
9/10/2020	13:28	9.38	11.02
9/10/2020	13:29	7.57	12.67
9/10/2020	13:30	7.66	12.70
9/10/2020	13:31	7.92	12.24
9/10/2020	13:32	8.42	11.85
9/10/2020	13:33	8.22	12.11
9/10/2020	13:34	8.21	12.18
9/10/2020	13:35	6.98	13.43
9/10/2020	13:36	7.00	13.04
9/10/2020	13:37	8.66	11.53
9/10/2020	13:38	8.67	11.65
9/10/2020	13:39	7.96	12.32
9/10/2020	13:40	8.22	12.10
9/10/2020	13:41	8.93	11.32
9/10/2020	13:42	8.88	11.42
9/10/2020	13:43	9.12	11.14
9/10/2020	13:44	8.41	11.80
9/10/2020	13:45	7.90	12.52

9/10/2020	13:46	8.52	11.74
9/10/2020	13:47	7.79	12.60
9/10/2020	13:48	7.91	12.36
9/10/2020	13:49	7.91	12.24
9/10/2020	13:50	8.27	12.10
9/10/2020	13:51	8.25	12.02
9/10/2020	13:52	8.61	11.67
9/10/2020	13:53	7.94	12.31
9/10/2020	13:54	7.95	12.38
9/10/2020	13:55	7.24	13.09
9/10/2020	13:56	8.01	12.17
9/10/2020	13:57	9.28	10.94
9/10/2020	13:58	8.58	11.58
9/10/2020	13:59	7.81	12.57
9/10/2020	14:00	7.49	12.82
9/10/2020	14:01	7.52	12.76
9/10/2020	14:02	7.69	12.60
9/10/2020	14:03	8.35	11.95
9/10/2020	14:04	7.65	12.59
9/10/2020	14:05	8.43	11.75
9/10/2020	14:06	7.88	12.39
9/10/2020	14:07	8.25	12.01
9/10/2020	14:08	7.41	12.98
9/10/2020	14:09	8.00	12.00
9/10/2020	14:10	8.71	11.63
9/10/2020	14:11	7.88	12.46
9/10/2020	14:12	8.10	12.14
9/10/2020	14:13	7.89	12.31
9/10/2020	14:14	7.89	12.25
9/10/2020	14:15	7.87	12.50
9/10/2020	14:16	8.32	11.96
9/10/2020	14:17	8.79	11.18
9/10/2020	14:18	9.43	10.91
9/10/2020	14:19	7.57	12.85
9/10/2020	14:20	7.37	12.95
9/10/2020	14:21	7.36	12.84
9/10/2020	14:22	7.68	12.42
9/10/2020	14:23	8.66	11.58
9/10/2020	14:24	7.87	12.39
9/10/2020	14:25	7.52	12.68
9/10/2020	14:26	8.50	11.61
9/10/2020	14:27	8.45	11.85
9/10/2020	14:28	8.10	12.24
9/10/2020	14:29	8.50	11.40
9/10/2020	14:30	8.91	11.46
9/10/2020	14:31	7.98	12.35
9/10/2020	14:32	7.87	12.33

9/10/2020	14:33	8.21	12.18	
9/10/2020	14:34	7.56	12.62	
9/10/2020	14:35	8.36	11.79	
Run 3 Average		8.16	12.12	
9/10/2020	14:36	5.27	6.52	
9/10/2020	14:37	0.03	0.06	Zero Bias
9/10/2020	14:38	2.80	3.73	
9/10/2020	14:39	10.17	10.50	O2 CO2 Bias
9/10/2020	14:40	4.00	4.15	
9/10/2020	14:41	-0.02	0.02	Zero
9/10/2020	14:42	4.43	4.79	
9/10/2020	14:43	10.30	10.55	
9/10/2020	14:44	10.32	10.55	Span
9/10/2020	14:45	17.71	17.89	
9/10/2020	14:46	18.77	18.91	High

Appendix A.1.3
Unit 1 Instrument Strip Charts

SPAN GAS RECORD

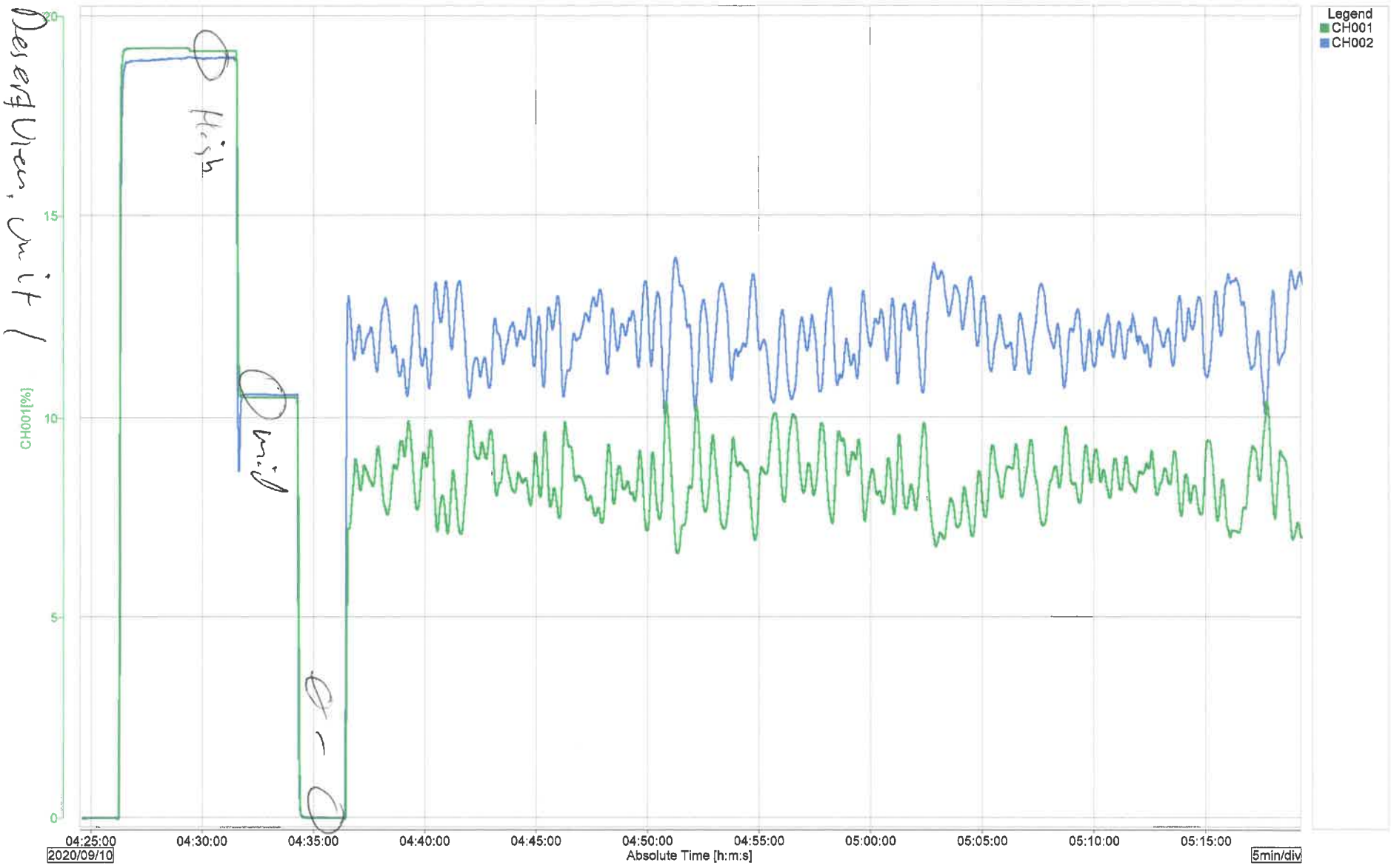
CLIENT/LOCATION: Desert View Power
Unit 1

DATE: 9/10/2020
BY: DW

	MID SPAN CYLINDER		HIGH SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO	CC88043	0.00		
O_2	DT0022871	10.48	DT0011386	19.15
CO_2	DT0022871	10.48	DT0011386	18.94

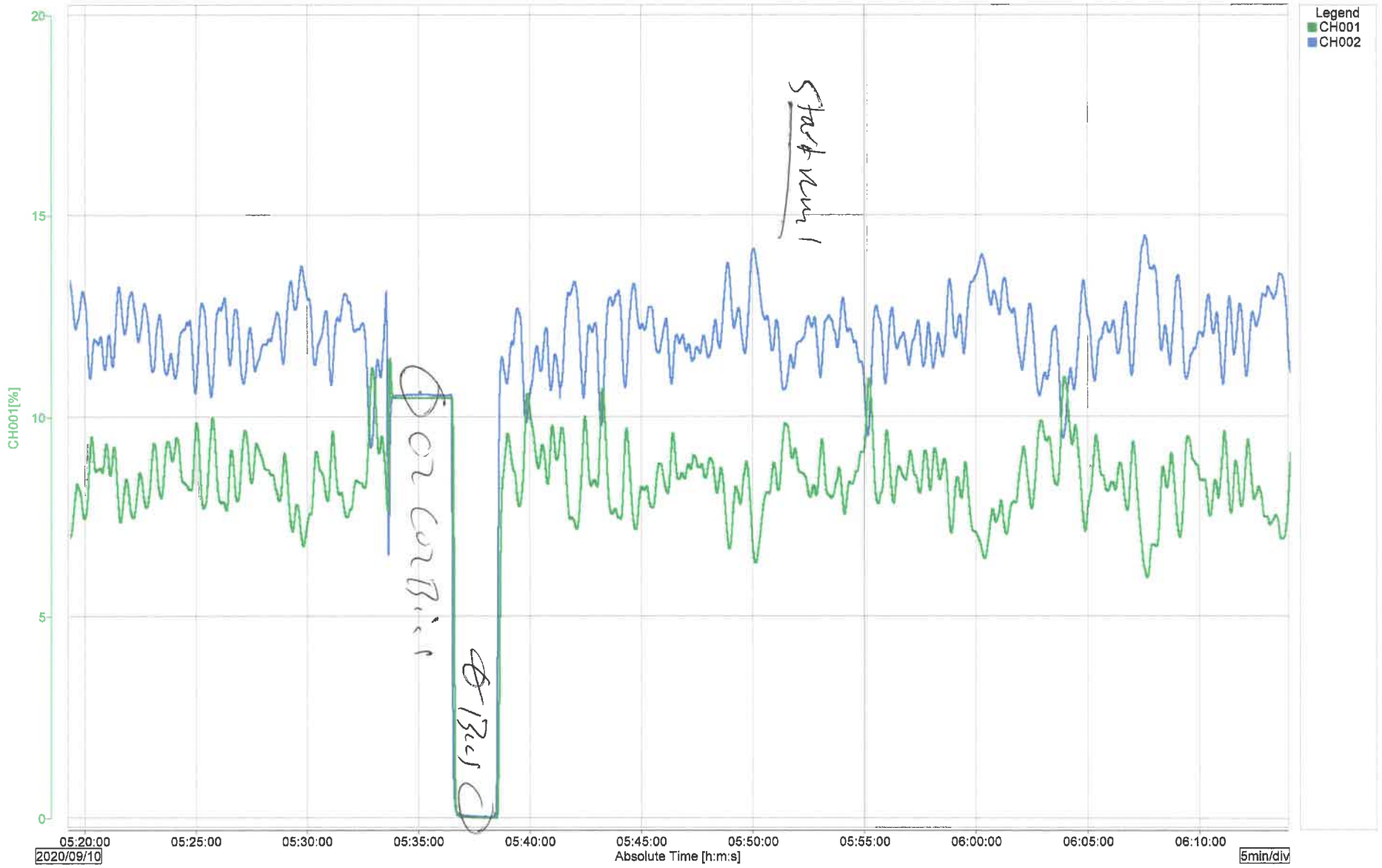
Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

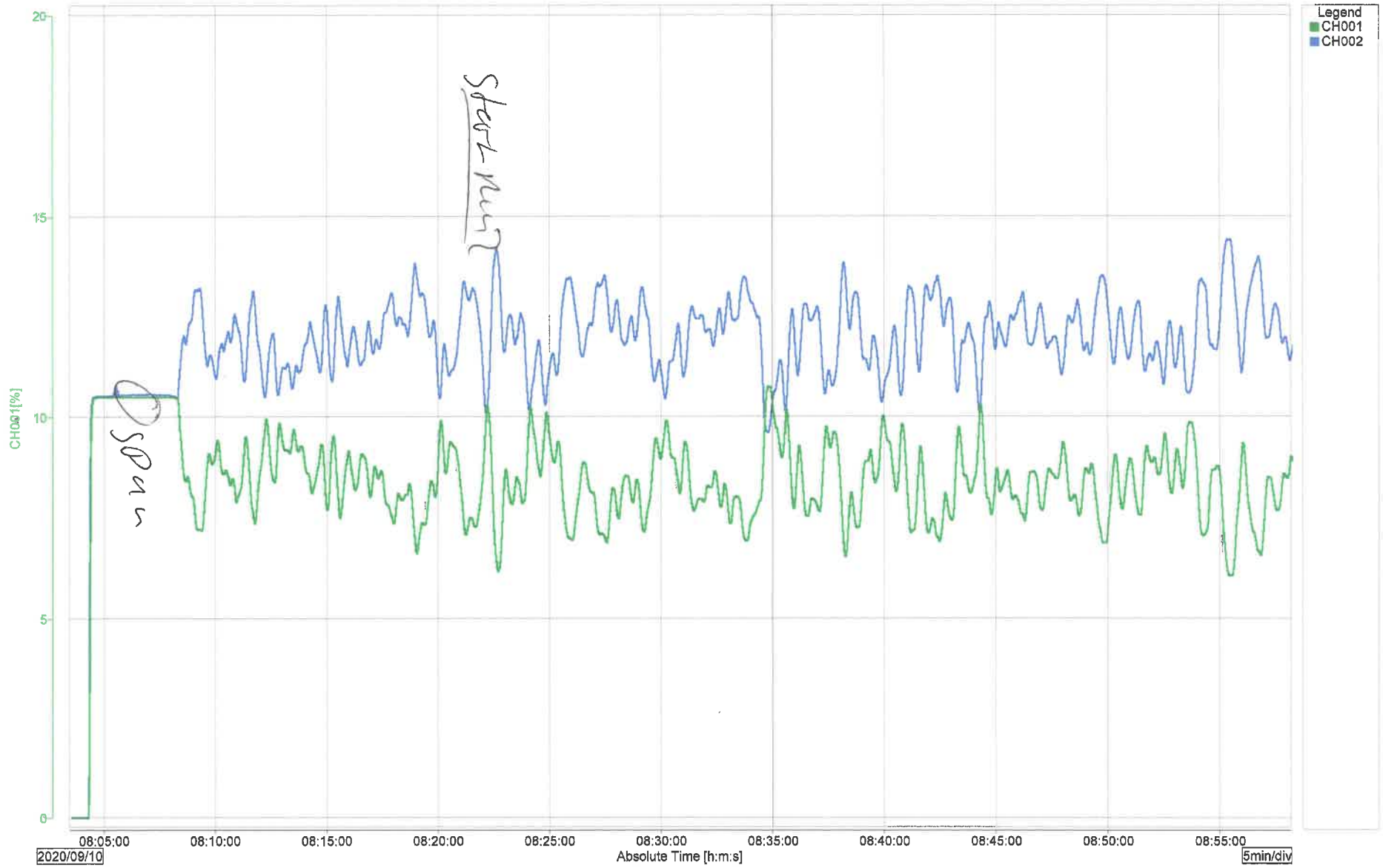
Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :

Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :

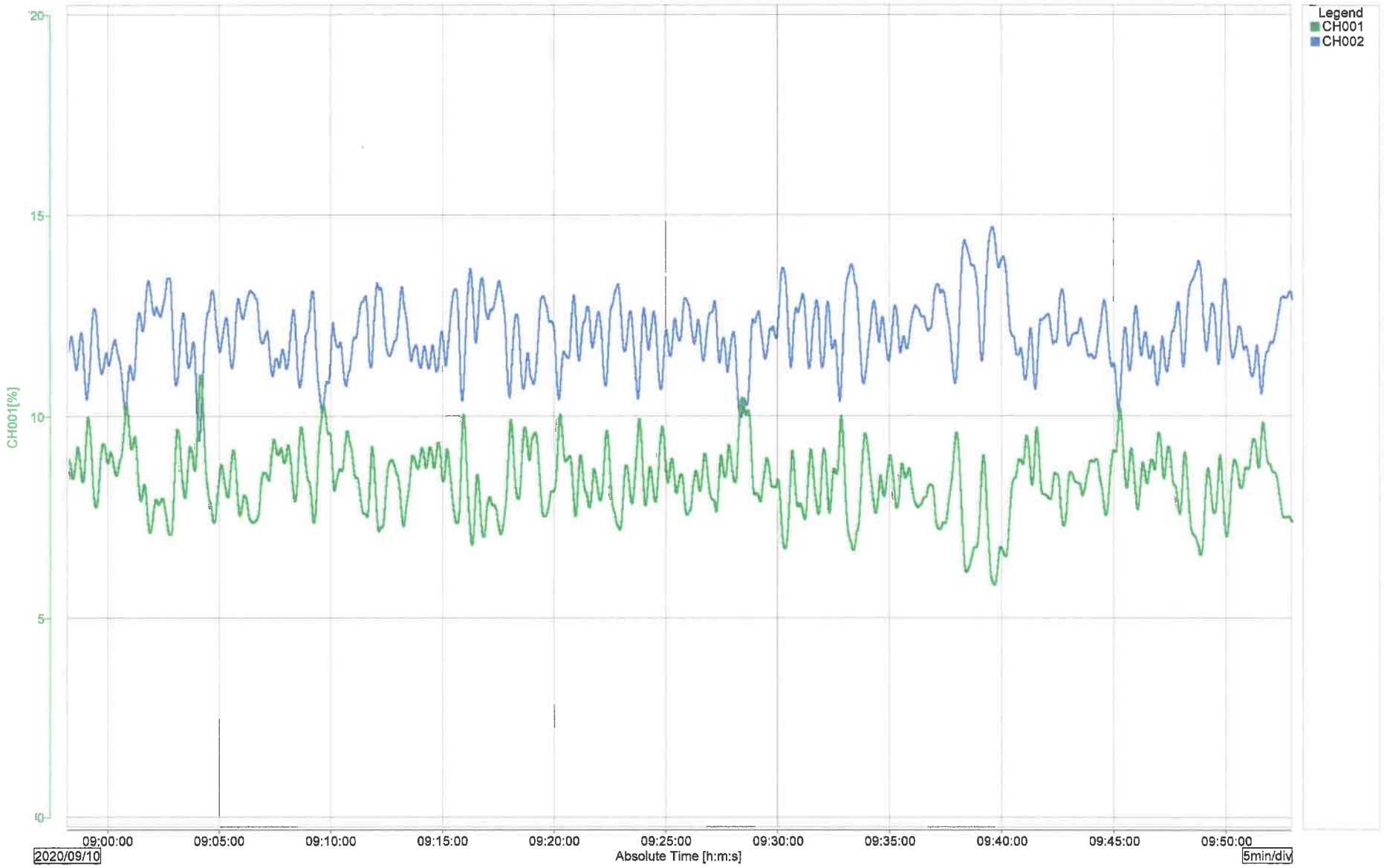
Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



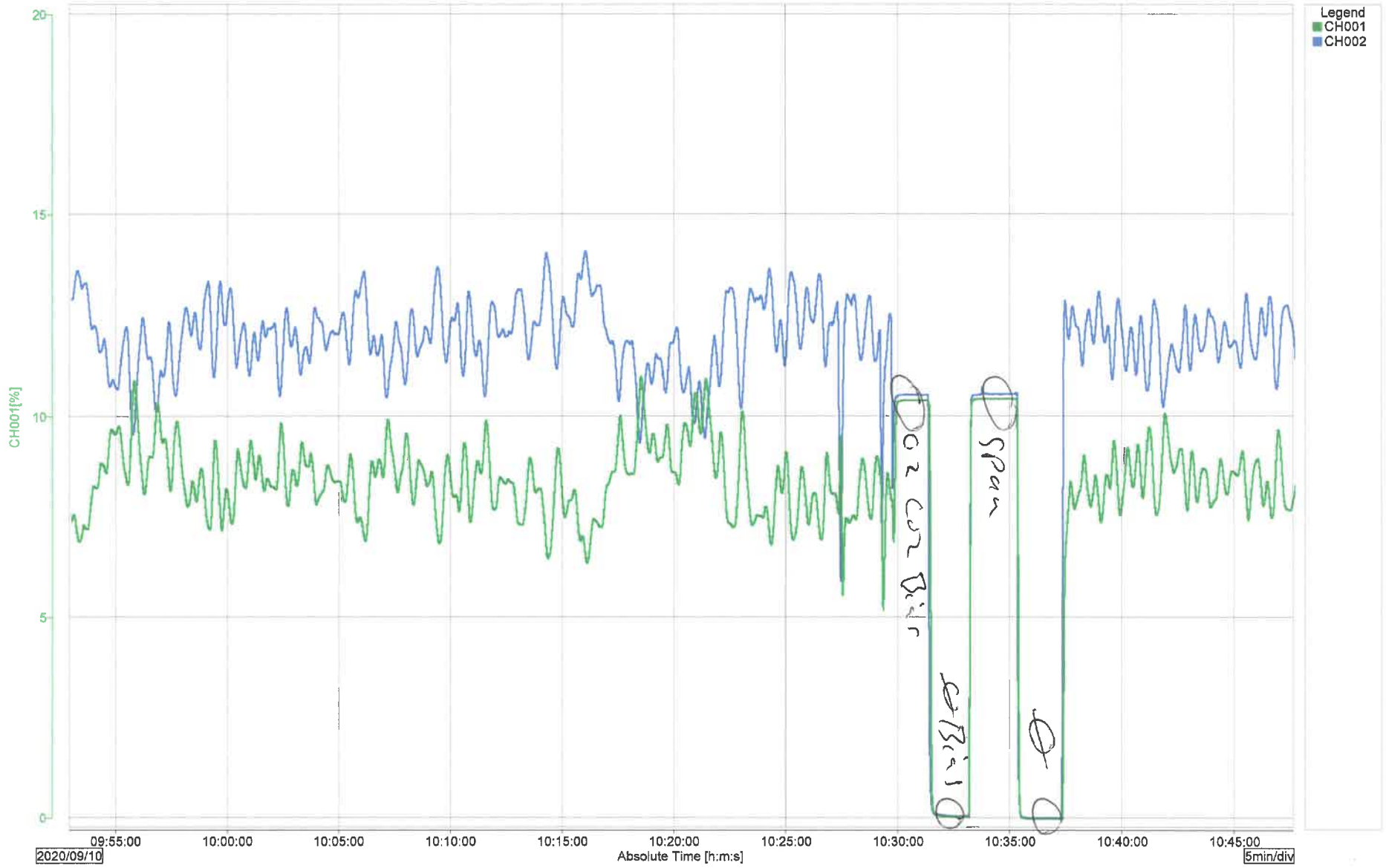
Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



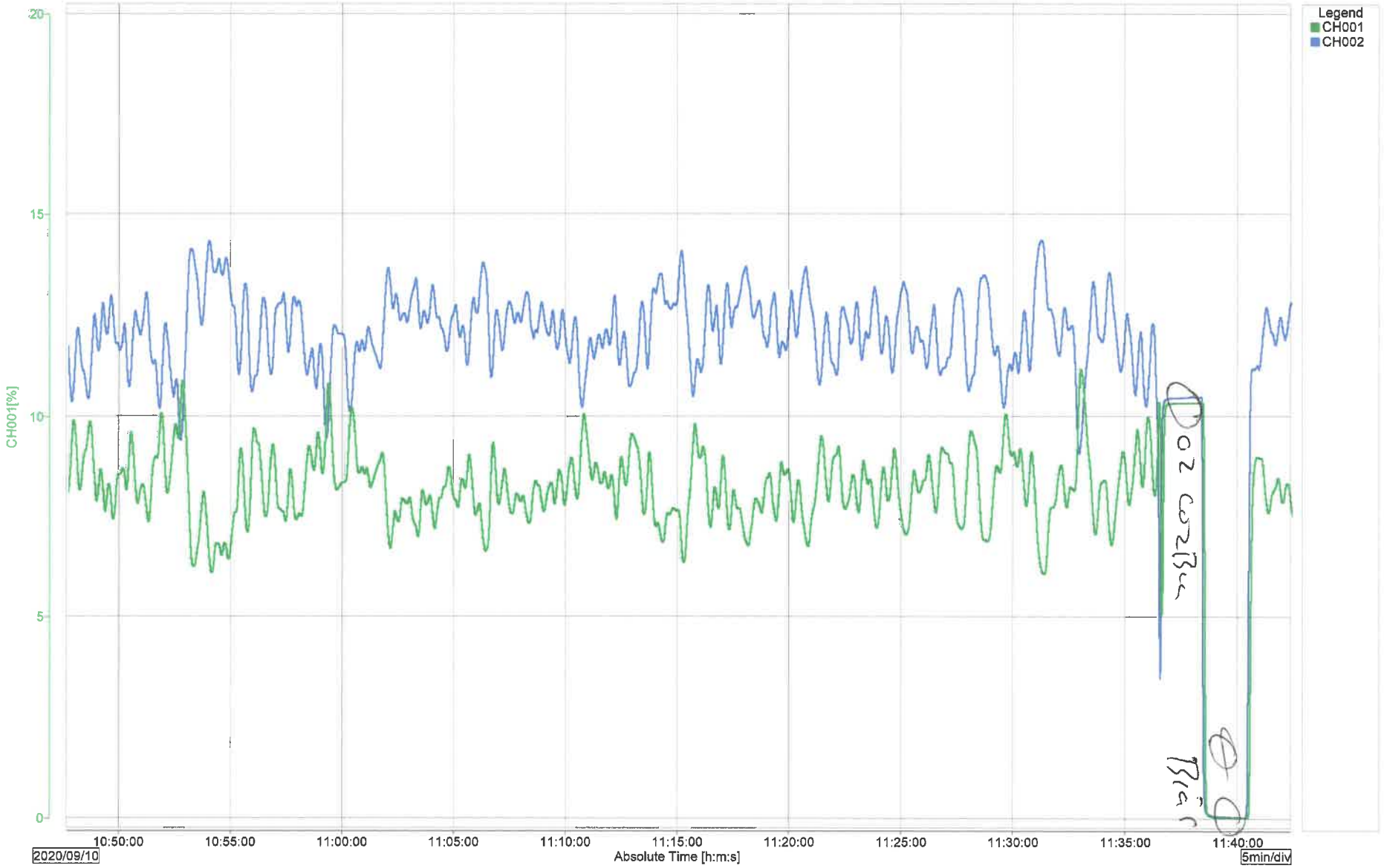
Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



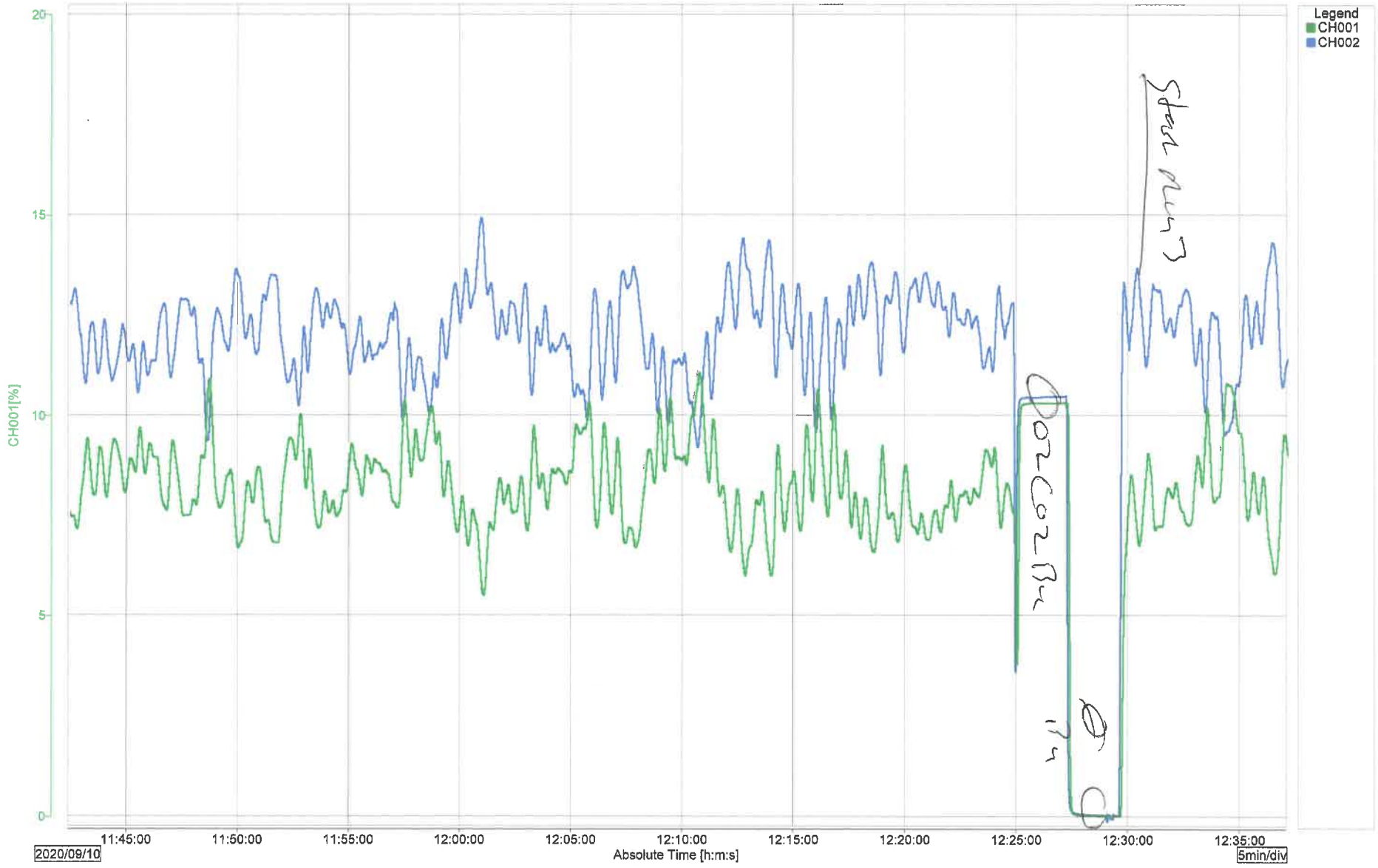
Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



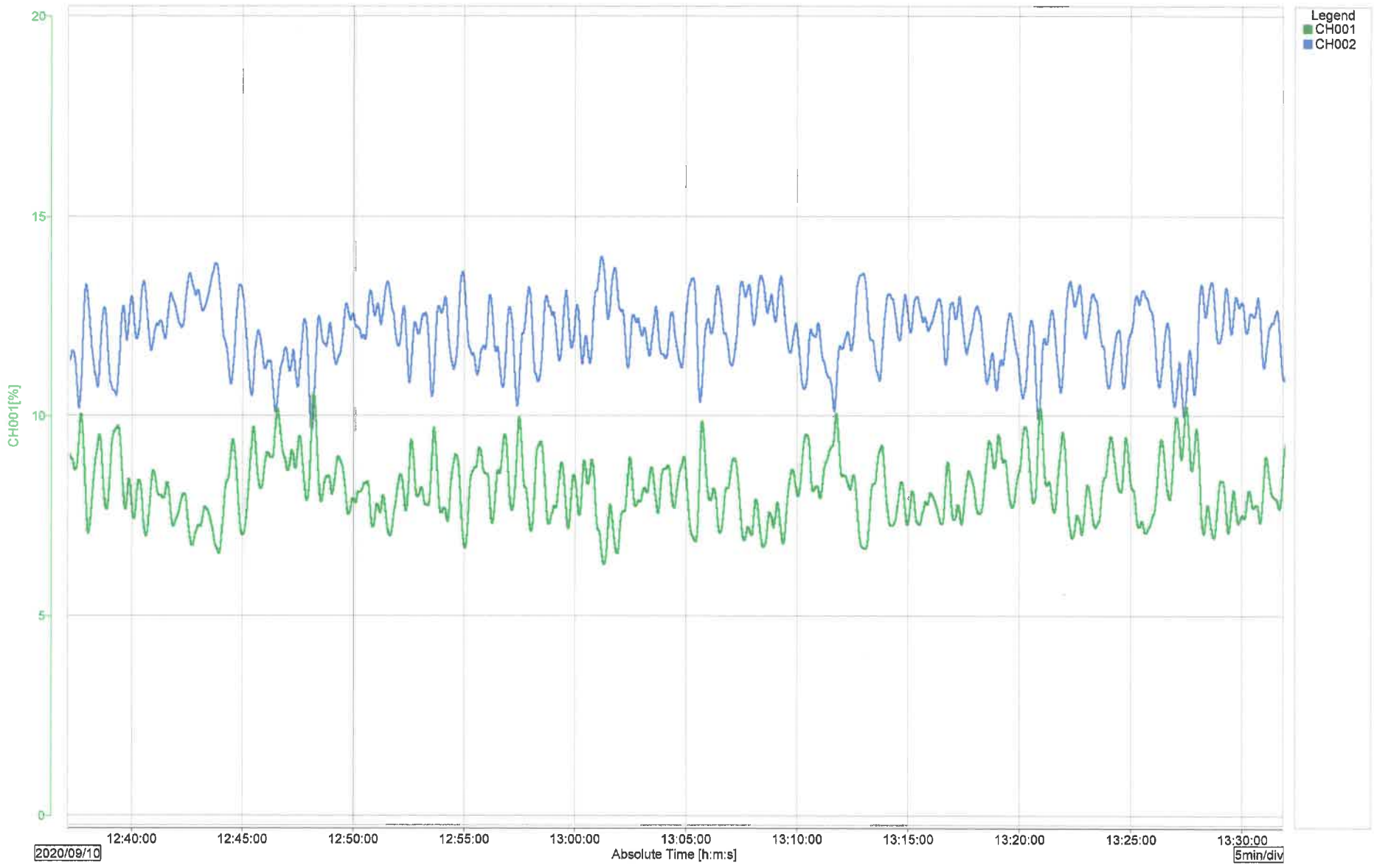
Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



Signature1 : No Sig.
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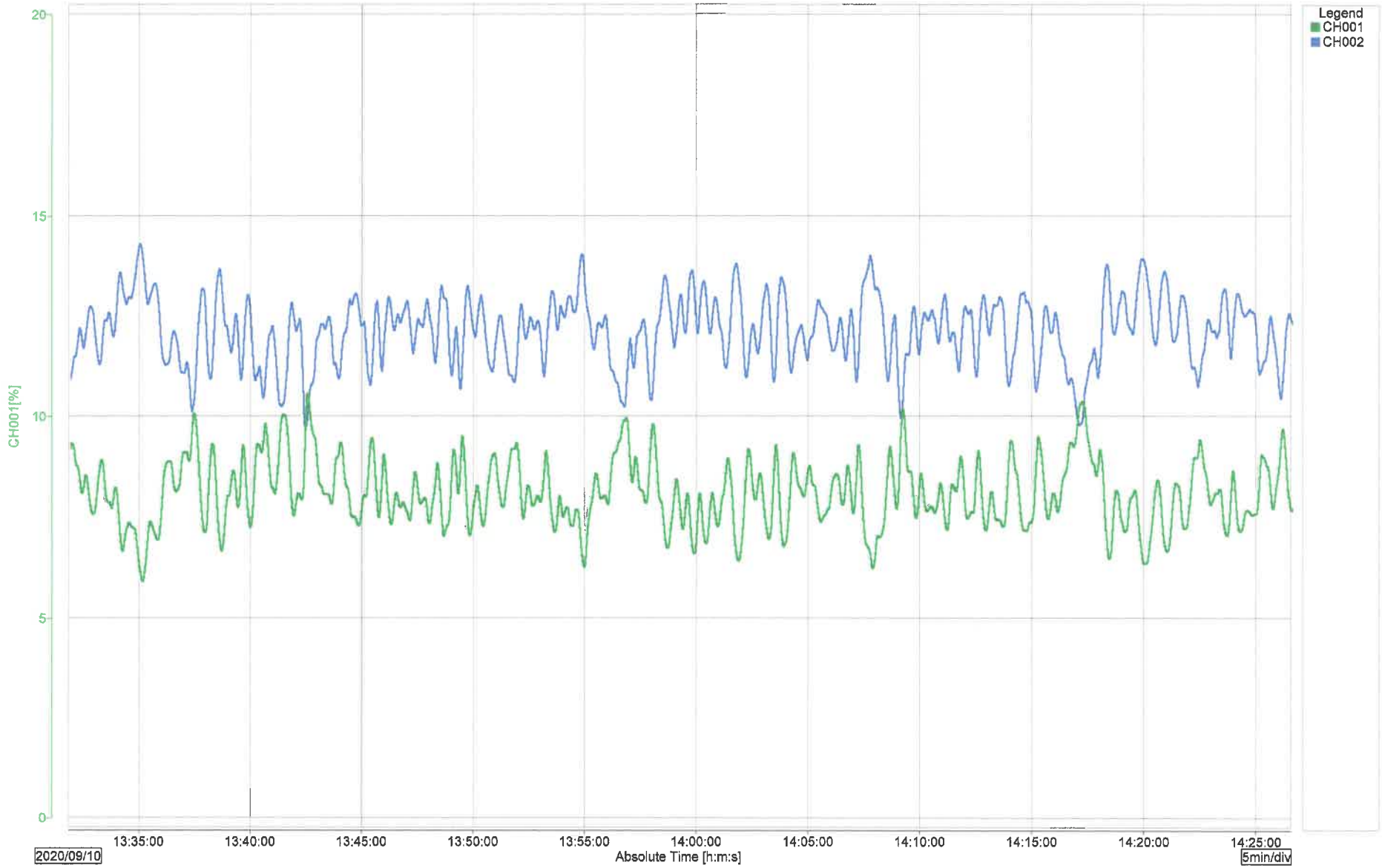
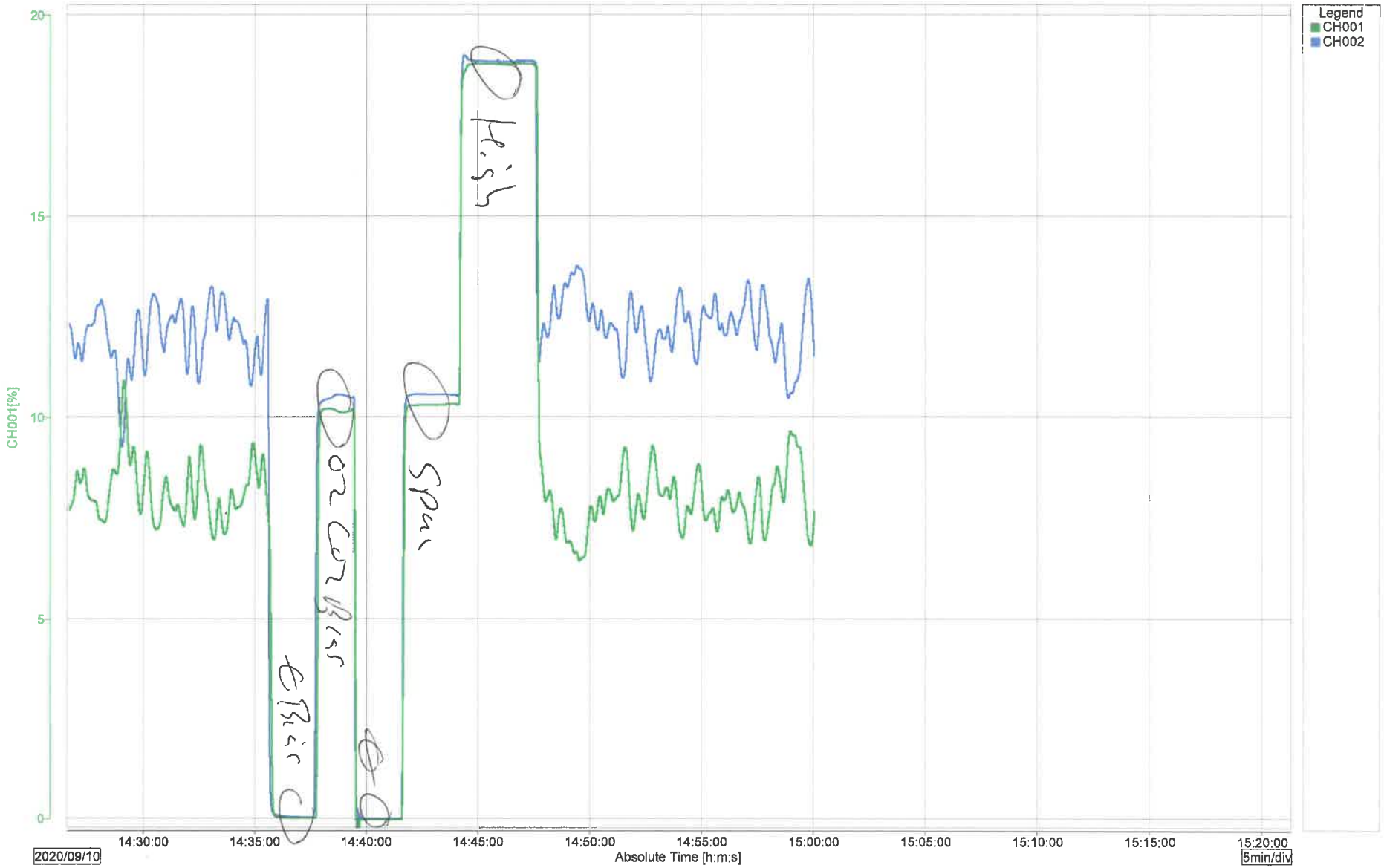
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/10 04:24:30.000 - 2020/09/10 14:59:56.000
Comment :



Appendix A.1.4
Unit 1 Hydrogen Chloride Data

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 1 Stack Breaching
DATE: 9/10/2020
RUN NO: 1 -HCL-U1
OPERATOR: Patrick Whitman
METER BOX NO: 29-WCS
METER ΔH@: 1.838
METER Yd: 1.009
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: V/V
Silica Gel Expanded, Y/N: no
Filter Condition after Test: ✓
Check Weight: 500.0/500.0

AMBIENT TEMPERATURE: 80°F
BAROMETRIC PRESSURE: 30.10
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: : 0.005 CFM@ 15 in. Hg.
POST-TEST LEAK RATE: : 0.005 CFM@ 15 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	Difference	
1	0.1N H2SO4	987.7	764.7	219	0
2	0.1N H2SO4	794.2	747.4	247	48.8
3	Empty	654.9	654.2	654 (avg 911)	0.7
4	Silica gel	1047.6	1033.1	14.5	14.5
	Rinse		50		50
	Total:				232.5

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	0553	339.510	1.3	1.6	400	253	255	40	74	75	5"		+.32
4	0557	342.295	1.0	1.3	399	254	257	40	72	74	5"		
3	0601	344.770	.98	1.2	400	253	255	41	73	73	5"		
2	0605	347.135	1.0	1.3	400	250	252	42	72	75	5"		
1	0609	349.595	1.0	1.3	400	253	254	42	72	76	5"		
P.C.	0613	352.087											
5	0614	352.087	1.2	1.5	400	254	255	43	73	77	5"		
4	0618	354.750	1.3	1.6	400	256	257	43	73	78	5"		
3	0622	357.410	1.1	1.4	400	255	251	43	74	78	5"		
2	0626	359.975	1.0	1.3	400	256	254	43	75	79	5"		
1	0630	362.440	.98	1.3	399	257	252	44	76	80	5"		
P.C.	0634	364.943											
5	0635	364.943	.78	1.3	400	256	251	44	77	81	5"		
4	0639	367.420	.87	1.1	399	257	253	44	78	82	5"		
3	0643	369.725	.83	1.1	399	254	257	44	78	84	5"		
2	0647	371.990	.87	1.1	399	252	253	45	79	85	5"		
1	0651	374.255	.85	1.1	399	254	252	45	80	86	5"		
Average	P.C. 0655	376.487											

Comments: Factor @ 0540=1.25/@ 0621=1.3/@ 0648=1.35 +V= 710.7

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 1 Stack Breaching
DATE: 9/10/2020
RUN NO: 1 -HCL-U1
OPERATOR: Patrick Whitman
METER BOX NO: 29-WCS
METER ΔH@: 1.838
METER Yd: 1.009
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: _____
Silica Gel Expanded, Y/N: See Pg 1
Filter Condition after Test: _____
Check Weight: _____

AMBIENT TEMPERATURE: See Pg 1
BAROMETRIC PRESSURE: See
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: : _____CFM@_____in. Hg.
POST-TEST LEAK RATE: :_____CFM@_____in. Hg.
PITOT LEAK CHECK - PRE:_____POST:_____
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	O.1N H2SO4			
2	O.1N H2SO4			
3	Empty			
4	Silica gel	See Pg. 1		
		See		
	Rinse		50	
	Total:			

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	0656	376.487	1.1	1.5	400	251	253	44	83	87	5"		1.32
4	0700	379.150	1.2	1.6	400	253	252	45	84	88	5"		
3	0704	381.830	1.0	1.4	400	255	256	45	85	89	5"		
2	0708	384.395	.95	1.3	400	256	255	45	86	90	5"		
1	0712	386.880	.92	1.2	401	257	254	46	85	90	5"		
P.C.	0716	389.866											
5	0717	389.866	1.1	1.5	402	253	255	47	86	90	5"		
4	0721	392.530	1.0	1.4	403	254	252	47	86	91	5"		
3	0725	394.510	1.1	1.5	402	255	253	47	86	91	5"		
2	0729	397.155	1.2	1.6	401	255	254	48	87	91	5"		
1	0733	399.910	.98	1.3	400	254	252	48	87	92	5"		
P.C.	0737	402.358											
5	0738	402.358	1.0	1.4	400	253	254	47	88	92	5"		
4	0742	405.000	1.2	1.6	400	254	257	48	88	92	5"		
3	0746	407.755	1.1	1.5	400	255	253	48	89	94	5"		
2	0750	410.480	.97	1.3	401	256	253	48	89	94	5"		
1	0754	412.920	.95	1.3	400	253	255	48	90	94	5"		
Average	0758	415.406	1.0308	1.367	400.1				82.9				

Comments: _____

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 1 Stack Breaching
DATE: 9/10/2020
RUN NO: -HCL-U1
OPERATOR: Patrick Whitman
METER BOX NO: 29-WCS
METER ΔH@: 1.838
METER Yd: 1.009
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: V/V
Silica Gel Expanded, Y/N: no
Filter Condition after Test: ✓
Check Weight: 500.0/500.0

AMBIENT TEMPERATURE: 92°F
BAROMETRIC PRESSURE: 30.10
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: : 0.005 CFM@ 15 in. Hg.
POST-TEST LEAK RATE: : 0.005 CFM@ 15 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	0.1N H2SO4	916.8	677.1	239.7
2	0.1N H2SO4	722.9	696.2	26.7
3	Empty	508.4	505.2	3.2
4	Silica gel	963.9	934.0	29.9
	Rinse		50	-50
	Total:			249.5

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	0822	417.080	1.2	1.6	400	253	254	40	90	93	5"		.32
4	0826	419.760	1.1	1.5	401	255	256	41	90	93	5"		
3	0830	422.515	1.1	1.5	403	256	251	42	91	94	5"		
2	0834	425.200	1.0	1.4	404	257	252	43	93	96	5"		
1	0838	427.810	.98	1.3	402	256	253	43	94	98	5"		
P.C.	0842	430.333											
5	0843	430.333	1.1	1.5	403	257	255	44	96	99	5"		
4	0847	433.045	1.2	1.6	404	256	257	44	97	99	5"		
3	0851	435.810	1.1	1.5	406	258	257	45	97	100	5"		
2	0855	438.525	1.0	1.4	408	256	252	45	98	101	5"		
1	0859	441.200	.95	1.3	408	257	253	46	98	102	5"		
P.C	0903	443.868											
5	0904	443.868	1.2	1.6	408	255	254	47	98	103	5"		
4	0908	446.650	1.1	1.5	409	256	255	47	98	103	5"		
3	0912	449.375	1.1	1.4	409	257	256	47	98	104	5"		
2	0916	451.995	.94	1.2	409	258	255	47	99	104	5"		
1	0920	454.580	.90	1.2	410	257	254	47	99	103	5"		
0924 Average	C	0924	457.163										

Comments: Factor @ 0820 = 1.35 / @ 0911 = 1.3 ΔH = PW 9/10/20

+V = 706.2

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 1 Stack Breaching
DATE: 9/3/2020
RUN NO: 2-HCL-U1
OPERATOR: Patrick Whitman
METER BOX NO: 29-WCS
METER ΔH@: 1.838
METER Yd: 1.009
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test:
Silica Gel Expanded, Y/N:
Filter Condition after Test:
Check Weight:

AMBIENT TEMPERATURE: 68 PW
BAROMETRIC PRESSURE:
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: : _____ CFM@ _____ in. Hg.
POST-TEST LEAK RATE: : _____ CFM@ _____ in. Hg.
PITOT LEAK CHECK - PRE: _____ POST: _____
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	0.1N H2SO4			
2	0.1N H2SO4			
3	Empty			
4	Silica gel			
	Rinse		50	
Total:				

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	0925	457.163	.98	1.3	409	253	256	48	100	104	5"		1.32
4	0929	459.600	.92	1.2	411	257	256	48	100	104	5"		
3	0933	462.095	.86	1.1	412	258	256	48	101	104	5"		
2	0937	464.410	.83	1.1	410	257	255	47	103	106	5"		
1	0941	466.725	.81	1.1	411	257	253	48	103	107	5"		
P.C.	0945	469.067											
5	0946	469.067	1.1	1.4	410	250	254	49	104	108	5"		
4	0950	471.680	1.2	1.6	411	253	256	48	104	108	5"		
3	0954	474.470	1.1	1.4	412	256	253	48	104	108	5"		
2	0958	477.115	.98	1.3	412	255	253	48	104	108	5"		
1	1002	479.680	.95	1.2	412	254	255	48	103	108	5"		
P.C.	1006	482.097											
5	1007	482.097	1.2	1.6	412	255	256	48	104	109	5"		
4	1011	484.935	1.2	1.6	413	254	257	49	105	110	5"		
3	1015	487.680	1.1	1.4	412	256	258	48	105	108	5"		
2	1019	490.345	1.0	1.3	413	258	257	49	104	109	5"		
1	1023	492.900	.97	1.3	413	253	252	49	105	110	5"		
Average	END 1027	495.404	1.03										
			1.0358	1.380	408.5				101.5				

Comments: _____

AA MONTR

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 1 Stack Breaching
DATE: 9/10/2020
RUN NO: 3 -HCL-U1
OPERATOR: Patrick Whitman
METER BOX NO: 29-WCS
METER ΔH@: 1.838
METER Yd: 1.009
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: √/√
Silica Gel Expanded, Y/N: no
Filter Condition after Test: ✓
Check Weight: 500.0/500.0

AMBIENT TEMPERATURE: 104°F
BAROMETRIC PRESSURE: 30.10
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: : 0.005 CFM@ 15 in. Hg.
POST-TEST LEAK RATE: : 0.005 CFM@ 15 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	Difference
1	0.1N H2SO4	979.1	774.1	205.0
2	0.1N H2SO4	837.0	766.7	70.3
3	Empty	655.6	655.0	0.6
4	Silica gel	956.5	939.1	17.4
	Rinse		50	-50
	Total:			243.3

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	1230	497.000	1.1	1.4	408	254	253	43	100	103	5"		1.32
4	1234	499.610	1.2	1.6	409	255	254	44	101	104	5"		
3	1238	502.345	1.0	1.3	409	256	255	44	100	104	5"		
2	1242	504.820	1.0	1.3	409	253	251	44	100	105	5"		
1	1246	507.315	.97	1.3	410	254	252	44	101	106	5"		
P.C.	1250	509.802											
5	1251	509.802	1.0	1.3	410	255	253	44	102	107	5"		
4	1255	512.365	1.2	1.6	410	252	254	45	103	107	5"		
3	1259	515.190	1.2	1.6	411	253	255	45	105	111	5"		
2	1303	518.230	1.0	1.4	410	254	257	45	105	112	5"		
1	1307	520.555	.95	1.3	410	255	258	46	106	113	5"		
P.C.	1311	523.093											
5	1312	523.093	1.1	1.5	410	254	253	48	107	112	5"		
4	1316	525.800	1.0	1.4	410	256	253	49	107	112	5"		
3	1320	528.410	.93	1.3	410	257	255	49	108	112	5"		
2	1324	530.940	.84	1.1	411	256	254	49	108	112	5"		
1	1328	533.265	.80	1.1	410	257	252	49	107	112	5"		
Average	P.C. 1332	535.592											

Comments: Factor @ 1230 = 1.3 / @ 1258 = 1.35 FV = 684.3

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 1 Stack Breaching
DATE: 9/10 /2020
RUN NO: 3 -HCL-U1
OPERATOR: Patrick Whitman
METER BOX NO: 29-WCS
METER ΔH@: 1.838
METER Yd: 1.009
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: _____
Silica Gel Expanded, Y/N: _____
Filter Condition after Test: See Pg 1
Check Weight: _____

AMBIENT TEMPERATURE: See Pg 1
BAROMETRIC PRESSURE: _____
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: : _____CFM@_____in. Hg.
POST-TEST LEAK RATE: :_____CFM@_____in. Hg.
PITOT LEAK CHECK - PRE: _____ POST: _____
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	Difference
1	O.1N H2SO4			
2	O.1N H2SO4			
3	Empty			
4	Silica gel	See Pg 1		
		See		
	Rinse		50	
	Total:			

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	1333	535.592	1.0	1.4	411	253	254	50	107	112	5"		1.32
4	1337	538.275	1.1	1.5	410	252	256	51	107	111	5"		
3	1341	540.995	1.0	1.4	410	254	255	52	108	111	5"		
2	1345	543.720	.98	1.3	411	253	256	53	107	112	5"		
1	1349	546.360	.94	1.3	411	254	255	53	108	112	5"		
P.C.	1353	548.903											
5	1354	548.903	1.2	1.6	410	253	256	54	107	113	5"		
4	1358	551.820	1.1	1.5	410	254	256	54	107	114	5"		
3	1402	554.565	1.0	1.4	410	253	252	55	107	113	5"		
2	1406	557.120	1.0	1.4	410	255	253	56	107	113	5"		
1	1410	559.915	.93	1.3	410	256	256	56	107	113	5"		
P.C.	1414	562.431											
5	1415	562.431	1.2	1.6	411	255	254	57	108	114	5"		
4	1419	565.240	1.0	1.4	411	256	257	57	108	114	5"		
3	1423	567.850	1.1	1.5	410	258	256	57	108	114	5"		
2	1427	570.655	1.0	1.4	410	259	258	58	108	114	5"		
1	1431	573.330	.92	1.2	410	258	259	58	107	113	5"		
Average	END 1435	575.783	1.027	1.39	410.1				106.3				

Comments: _____

1-HCL-U1							2-HCL-U1							3-HCL-U1						
	dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm	
5	1.30	1.140	1.6	400	74	75	5	1.20	1.095	1.6	400	90	93	5	1.10	1.049	1.4	408	100	103
4	1.00	1.000	1.3	399	72	74	4	1.10	1.049	1.5	401	90	93	4	1.20	1.095	1.6	409	101	104
3	0.98	0.990	1.2	400	73	75	3	1.10	1.049	1.5	403	91	94	3	1.00	1.000	1.3	409	100	104
2	1.00	1.000	1.3	400	72	75	2	1.00	1.000	1.4	404	93	96	2	1.00	1.000	1.3	409	100	105
1	1.00	1.000	1.3	400	72	76	1	0.98	0.990	1.3	402	94	98	1	0.97	0.985	1.3	410	101	106
5	1.20	1.095	1.5	400	73	77	5	1.10	1.049	1.5	403	96	99	5	1.00	1.000	1.3	410	102	107
4	1.30	1.140	1.6	400	73	78	4	1.20	1.095	1.6	404	97	99	4	1.20	1.095	1.6	410	103	107
3	1.10	1.049	1.4	400	74	78	3	1.10	1.049	1.5	406	97	100	3	1.20	1.095	1.6	411	105	111
2	1.00	1.000	1.3	400	75	79	2	1.00	1.000	1.4	408	98	101	2	1.00	1.000	1.4	410	105	112
1	0.98	0.990	1.3	399	76	80	1	0.95	0.975	1.3	408	98	102	1	0.95	0.975	1.3	410	106	113
5	0.98	0.990	1.3	400	77	81	5	1.20	1.095	1.6	408	98	103	5	1.10	1.049	1.5	410	107	112
4	0.87	0.933	1.1	399	78	82	4	1.10	1.049	1.5	409	98	103	4	1.00	1.000	1.4	410	107	112
3	0.83	0.911	1.1	399	78	84	3	1.10	1.049	1.4	409	98	104	3	0.93	0.964	1.3	410	108	112
2	0.87	0.933	1.1	399	79	85	2	0.94	0.970	1.2	409	99	104	2	0.84	0.917	1.1	411	108	112
1	0.85	0.922	1.1	399	80	86	1	0.90	0.949	1.2	410	99	103	1	0.80	0.894	1.1	410	107	112
5	1.10	1.049	1.5	400	83	87	5	0.98	0.990	1.3	409	100	104	5	1.00	1.000	1.4	411	107	112
4	1.20	1.095	1.6	400	84	88	4	0.92	0.959	1.2	411	100	104	4	1.10	1.049	1.5	410	107	111
3	1.00	1.000	1.4	400	85	89	3	0.86	0.927	1.1	410	101	104	3	1.00	1.000	1.4	410	108	111
2	0.95	0.975	1.3	400	86	90	2	0.83	0.911	1.1	410	103	106	2	0.98	0.990	1.3	411	107	112
1	0.92	0.959	1.2	401	85	90	1	0.81	0.900	1.1	411	103	107	1	0.94	0.970	1.3	411	108	112
5	1.10	1.049	1.5	402	86	90	5	1.10	1.049	1.4	410	104	108	5	1.20	1.095	1.6	410	107	113
4	1.00	1.000	1.4	403	86	91	4	1.20	1.095	1.6	411	104	108	4	1.10	1.049	1.5	410	107	114
3	1.10	1.049	1.5	402	86	91	3	1.10	1.049	1.4	412	104	108	3	1.00	1.000	1.4	410	107	113
2	1.20	1.095	1.6	401	87	91	2	0.98	0.990	1.3	412	104	108	2	1.00	1.000	1.4	410	107	113
1	0.98	0.990	1.3	400	87	92	1	0.95	0.975	1.2	412	103	108	1	0.93	0.964	1.3	410	107	113
5	1.00	1.000	1.4	400	88	92	5	1.20	1.095	1.6	412	104	109	5	1.20	1.095	1.6	411	108	114
4	1.20	1.095	1.6	400	88	92	4	1.20	1.095	1.6	413	105	110	4	1.00	1.000	1.4	411	108	114
3	1.10	1.049	1.5	400	89	94	3	1.10	1.049	1.4	412	105	108	3	1.10	1.049	1.5	410	108	114
2	0.97	0.985	1.3	401	89	94	2	1.00	1.000	1.3	413	104	109	2	1.00	1.000	1.4	410	108	114
1	0.95	0.975	1.3	400	90	94	1	0.97	0.985	1.3	413	105	110	1	0.92	0.959	1.2	410	107	113
Average		1.0308	1.363	400.1	82.9		Average		1.0358	1.380	408.5	101.5		Average		1.0227	1.390	410.1	108.3	

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.031	339.51	983.7	764.7	219.0
Meter Pressure (iwg)	1.363	415.406	796.2	747.4	48.8
Stack Temperature (F)	400.133	75.896	654.9	654.2	0.7
Meter Temperature (F)	82.917		1047.1	1033.1	14.0
Meter Volume (acf)	75.896			50	-50.0
Liquid Volume (ml)	232.500				232.5

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.036	417	916.8	677.1	239.7
Meter Pressure (iwg)	1.380	495.404	722.9	696.2	26.7
Stack Temperature (F)	408.500	78.404	508.4	505.2	3.2
Meter Temperature (F)	101.467		963.9	934	29.9
Meter Volume (acf)	78.404			50	-50.0
Liquid Volume (ml)	249.500				249.5

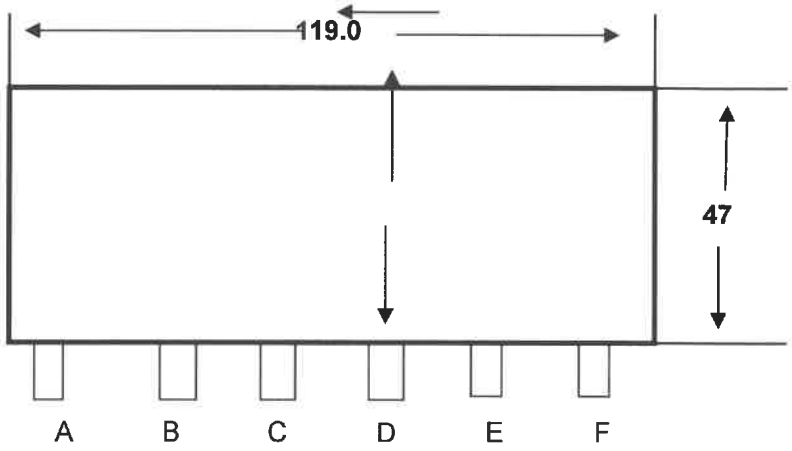
		Meter Vol	Imp	Imp	
Delta P (iwg)	1.023	497	979.1	774.1	205.0
Meter Pressure (iwg)	1.390	575.783	837.0	766.7	70.3
Stack Temperature (F	410.067	78.783	655.6	655	0.6
Meter Temperature (F	108.267		956.5	939.1	17.4
Meter Volume (acf)	78.783			50	-50.0
Liquid Volume (ml)	243.3				243.3

Appendix A.2
Unit 2 Data

Appendix A.2.1
Unit 2 Sample Location

Client: Desert View Power Date: 9/10/2020

Sample Location: Unit 1-2 Prepared By: Dave Wonderly



		Point No.	Sample Point	
H (in.)	**119.0**			
		1	4.7	17.7
W (in.)	**47.0**	2	14.1	27.1
		3	23.5	36.5
Nipple length	**13.0**	4	32.9	45.9
		5	42.3	55.3
Distance between points	**9.40**			
Stack Area (ft^2)	**38.84**			

Appendix A.2.2
Unit 2 CEM Data

Date	Time	O2 %	CO2 %	
9/9/2020	7:48	-0.01	0.02	
9/9/2020	7:49	16.72	16.19	
9/9/2020	7:50	19.14	18.97	
9/9/2020	7:51	19.14	18.95	High
9/9/2020	7:52	13.28	12.95	
9/9/2020	7:53	10.51	10.60	Mid
9/9/2020	7:54	1.82	1.80	
9/9/2020	7:55	-0.01	0.02	Zero
9/9/2020	7:56	7.24	7.46	
9/9/2020	7:57	10.48	10.54	O2 CO2 Bias
9/9/2020	7:58	7.22	6.63	
9/9/2020	7:59	0.03	0.07	Zero Bias
9/9/2020	8:00	2.77	5.03	
9/9/2020	8:01	8.83	11.55	
9/9/2020	8:02	8.94	11.50	
9/9/2020	8:03	8.48	11.87	
9/9/2020	8:04	8.86	11.68	
9/9/2020	8:05	8.75	11.71	
9/9/2020	8:06	8.32	12.12	
9/9/2020	8:07	8.65	11.77	
9/9/2020	8:08	8.89	11.62	
9/9/2020	8:09	8.62	11.87	
9/9/2020	8:10	9.11	11.28	
9/9/2020	8:11	8.39	12.05	
9/9/2020	8:12	8.98	11.47	
9/9/2020	8:13	8.55	11.90	
9/9/2020	8:14	9.05	11.33	
9/9/2020	8:15	8.21	12.39	
9/9/2020	8:16	8.01	12.39	
9/9/2020	8:17	8.14	12.21	
9/9/2020	8:18	8.23	12.28	
9/9/2020	8:19	7.71	12.73	
9/9/2020	8:20	8.21	12.14	
9/9/2020	8:21	8.18	12.30	
9/9/2020	8:22	8.29	12.10	
9/9/2020	8:23	8.54	11.96	
9/9/2020	8:24	7.91	12.56	
9/9/2020	8:25	7.89	12.56	
9/9/2020	8:26	8.80	11.57	
9/9/2020	8:27	9.44	10.97	
9/9/2020	8:28	8.74	11.86	
9/9/2020	8:29	7.60	12.85	
9/9/2020	8:30	9.12	11.32	
9/9/2020	8:31	8.72	11.79	
9/9/2020	8:32	8.70	11.72	

9/9/2020	8:33	9.18	11.34
9/9/2020	8:34	8.88	11.68
9/9/2020	8:35	8.97	11.41
9/9/2020	8:36	9.68	10.92
9/9/2020	8:37	8.68	11.81
9/9/2020	8:38	8.65	11.77
9/9/2020	8:39	8.13	12.44
9/9/2020	8:40	9.21	11.19
9/9/2020	8:41	8.55	11.96
9/9/2020	8:42	8.48	12.02
9/9/2020	8:43	8.54	12.03
9/9/2020	8:44	7.98	12.52
9/9/2020	8:45	8.12	12.33
9/9/2020	8:46	7.92	12.61
9/9/2020	8:47	7.72	12.75
9/9/2020	8:48	8.71	11.63
9/9/2020	8:49	8.23	12.41
9/9/2020	8:50	8.31	11.98
9/9/2020	8:51	8.57	11.97
9/9/2020	8:52	7.63	12.95
9/9/2020	8:53	9.16	11.22
9/9/2020	8:54	9.43	11.06
9/9/2020	8:55	8.79	11.75
9/9/2020	8:56	8.81	11.61
9/9/2020	8:57	9.12	11.22
9/9/2020	8:58	8.89	11.56
9/9/2020	8:59	8.51	12.01
9/9/2020	9:00	8.22	12.19
9/9/2020	9:01	8.65	11.73
9/9/2020	9:02	8.50	12.03
9/9/2020	9:03	8.79	11.66
9/9/2020	9:04	9.01	11.42
9/9/2020	9:05	9.00	11.35
9/9/2020	9:06	9.32	11.19
9/9/2020	9:07	8.43	12.10
9/9/2020	9:08	8.26	12.22
9/9/2020	9:09	7.90	12.57
9/9/2020	9:10	8.97	11.42
9/9/2020	9:11	8.93	11.52
9/9/2020	9:12	8.46	11.89
9/9/2020	9:13	9.28	11.23
9/9/2020	9:14	8.81	11.67
9/9/2020	9:15	8.70	11.74
9/9/2020	9:16	8.50	11.97
9/9/2020	9:17	8.04	12.30
9/9/2020	9:18	8.49	11.98
9/9/2020	9:19	9.23	11.16

9/9/2020	9:20	9.40	11.09
9/9/2020	9:21	8.91	11.46
9/9/2020	9:22	9.33	11.06
9/9/2020	9:23	7.94	12.56
9/9/2020	9:24	8.18	12.23
9/9/2020	9:25	8.58	11.77
9/9/2020	9:26	8.43	12.07
9/9/2020	9:27	8.40	11.95
9/9/2020	9:28	9.35	10.97
9/9/2020	9:29	9.59	10.94
9/9/2020	9:30	9.14	11.36
9/9/2020	9:31	9.11	11.25
9/9/2020	9:32	9.21	11.15
9/9/2020	9:33	8.94	11.55
9/9/2020	9:34	8.56	11.92
9/9/2020	9:35	7.93	12.51
9/9/2020	9:36	8.86	11.54
9/9/2020	9:37	8.23	12.14
9/9/2020	9:38	8.28	12.09
9/9/2020	9:39	9.48	10.89
9/9/2020	9:40	9.22	11.16
9/9/2020	9:41	8.74	11.80
9/9/2020	9:42	8.99	11.39
9/9/2020	9:43	9.31	11.15
9/9/2020	9:44	8.18	12.25
9/9/2020	9:45	8.23	12.21
9/9/2020	9:46	8.61	11.79
9/9/2020	9:47	8.69	11.70
9/9/2020	9:48	8.24	12.24
9/9/2020	9:49	7.54	12.89
9/9/2020	9:50	8.39	12.07
9/9/2020	9:51	8.37	12.04
9/9/2020	9:52	9.38	11.02
9/9/2020	9:53	8.99	11.46
9/9/2020	9:54	8.97	11.56
9/9/2020	9:55	8.94	11.39
9/9/2020	9:56	9.36	11.08
9/9/2020	9:57	8.74	11.73
9/9/2020	9:58	8.94	11.52
9/9/2020	9:59	8.34	12.02
9/9/2020	10:00	8.42	12.09
9/9/2020	10:01	7.22	13.18
9/9/2020	10:02	7.76	12.65
9/9/2020	10:03	8.88	11.49
9/9/2020	10:04	8.39	12.07
9/9/2020	10:05	8.28	12.03
9/9/2020	10:06	8.70	11.74

9/9/2020	10:07	8.62	11.75	
9/9/2020	10:08	9.41	10.90	
9/9/2020	10:09	9.77	10.65	
9/9/2020	10:10	9.31	11.21	
9/9/2020	10:11	7.95	12.33	
9/9/2020	10:12	8.28	12.16	
9/9/2020	10:13	7.63	12.72	
9/9/2020	10:14	7.75	12.68	
9/9/2020	10:15	7.18	13.19	
9/9/2020	10:16	8.37	11.90	
Run 1 Average		8.64	11.77	
9/9/2020	10:17	2.31	2.06	
9/9/2020	10:18	0.02	0.04	Zero Bias
9/9/2020	10:19	2.83	3.42	
9/9/2020	10:20	10.43	10.42	O2 CO2 Bias
9/9/2020	10:21	3.96	4.07	
9/9/2020	10:22	-0.01	0.02	Zero
9/9/2020	10:23	3.86	4.10	
9/9/2020	10:24	10.47	10.49	
9/9/2020	10:25	10.47	10.51	Span
9/9/2020	10:26	8.32	12.39	
9/9/2020	10:27	6.47	13.92	
9/9/2020	10:28	6.11	14.17	
9/9/2020	10:29	6.58	13.77	
9/9/2020	10:30	7.92	12.25	
9/9/2020	10:31	9.09	11.32	
9/9/2020	10:32	8.85	11.43	
9/9/2020	10:33	9.51	10.95	
9/9/2020	10:34	9.56	10.75	
9/9/2020	10:35	8.69	11.75	
9/9/2020	10:36	7.50	12.94	
9/9/2020	10:37	7.45	12.89	
9/9/2020	10:38	7.26	13.02	
9/9/2020	10:39	9.06	11.24	
9/9/2020	10:40	9.73	10.52	
9/9/2020	10:41	9.36	11.17	
9/9/2020	10:42	8.33	12.04	
9/9/2020	10:43	8.60	11.75	
9/9/2020	10:44	8.88	11.37	
9/9/2020	10:45	9.54	10.79	
9/9/2020	10:46	10.21	10.07	
9/9/2020	10:47	9.39	10.98	
9/9/2020	10:48	9.18	11.19	
9/9/2020	10:49	9.55	10.89	
9/9/2020	10:50	8.58	11.77	
9/9/2020	10:51	8.54	11.74	
9/9/2020	10:52	9.34	10.86	

9/9/2020	10:53	10.64	9.84
9/9/2020	10:54	10.75	9.49
9/9/2020	10:55	11.23	9.12
9/9/2020	10:56	11.40	9.02
9/9/2020	10:57	10.41	9.99
9/9/2020	10:58	9.88	10.48
9/9/2020	10:59	10.75	9.54
9/9/2020	11:00	11.53	8.66
9/9/2020	11:01	14.33	6.09
9/9/2020	11:02	14.28	6.32
9/9/2020	11:03	11.51	8.80
9/9/2020	11:04	11.22	9.02
9/9/2020	11:05	10.46	10.21
9/9/2020	11:06	8.37	11.91
9/9/2020	11:07	9.35	10.83
9/9/2020	11:08	10.63	9.78
9/9/2020	11:09	11.07	9.13
9/9/2020	11:10	11.79	8.54
9/9/2020	11:11	11.66	8.87
9/9/2020	11:12	11.11	9.30
9/9/2020	11:13	11.08	9.21
9/9/2020	11:14	12.49	7.79
9/9/2020	11:15	13.54	6.94
9/9/2020	11:16	12.06	8.47
9/9/2020	11:17	10.87	9.53
9/9/2020	11:18	9.94	10.45
9/9/2020	11:19	9.72	10.68
9/9/2020	11:20	8.38	12.05
9/9/2020	11:21	7.45	12.92
9/9/2020	11:22	6.85	13.46
9/9/2020	11:23	8.25	11.97
9/9/2020	11:24	9.38	10.88
9/9/2020	11:25	9.56	10.89
9/9/2020	11:26	8.86	11.53
9/9/2020	11:27	8.16	12.16
9/9/2020	11:28	7.57	12.80
9/9/2020	11:29	8.05	12.21
9/9/2020	11:30	8.86	11.42
9/9/2020	11:31	8.69	11.64
9/9/2020	11:32	8.17	12.20
9/9/2020	11:33	8.72	11.59
9/9/2020	11:34	9.07	11.17
9/9/2020	11:35	8.43	11.96
9/9/2020	11:36	6.83	13.54
9/9/2020	11:37	6.61	13.69
9/9/2020	11:38	7.84	12.35
9/9/2020	11:39	9.27	10.90

9/9/2020	11:40	9.06	11.16
9/9/2020	11:41	8.12	12.23
9/9/2020	11:42	8.14	12.22
9/9/2020	11:43	8.62	11.59
9/9/2020	11:44	8.81	11.43
9/9/2020	11:45	8.52	11.88
9/9/2020	11:46	8.87	11.38
9/9/2020	11:47	8.25	12.07
9/9/2020	11:48	9.02	11.34
9/9/2020	11:49	8.99	11.29
9/9/2020	11:50	8.98	11.32
9/9/2020	11:51	8.56	11.83
9/9/2020	11:52	8.36	12.00
9/9/2020	11:53	8.40	11.92
9/9/2020	11:54	8.66	11.71
9/9/2020	11:55	7.86	12.49
9/9/2020	11:56	7.93	12.41
9/9/2020	11:57	8.21	12.15
9/9/2020	11:58	8.11	12.24
9/9/2020	11:59	9.08	11.25
9/9/2020	12:00	8.66	11.60
9/9/2020	12:01	8.24	12.11
9/9/2020	12:02	8.27	11.96
9/9/2020	12:03	8.56	11.84
9/9/2020	12:04	8.72	11.56
9/9/2020	12:05	8.67	11.60
9/9/2020	12:06	7.96	12.47
9/9/2020	12:07	8.29	11.97
9/9/2020	12:08	8.06	12.25
9/9/2020	12:09	8.85	11.31
9/9/2020	12:10	8.48	11.90
9/9/2020	12:11	8.30	12.08
9/9/2020	12:12	7.86	12.34
9/9/2020	12:13	8.28	12.02
9/9/2020	12:14	8.12	12.11
9/9/2020	12:15	9.00	11.29
9/9/2020	12:16	8.85	11.35
9/9/2020	12:17	8.65	11.68
9/9/2020	12:18	8.30	12.03
9/9/2020	12:19	8.98	11.20
9/9/2020	12:20	8.84	11.41
9/9/2020	12:21	9.07	11.22
9/9/2020	12:22	8.62	11.62
9/9/2020	12:23	8.67	11.52
9/9/2020	12:24	8.63	11.74
9/9/2020	12:25	7.73	12.52
9/9/2020	12:26	8.72	11.52

9/9/2020	12:27	8.61	11.73	
9/9/2020	12:28	8.47	11.72	
9/9/2020	12:29	8.69	11.59	
9/9/2020	12:30	8.76	11.52	
9/9/2020	12:31	8.23	11.98	
9/9/2020	12:32	9.29	10.93	
9/9/2020	12:33	8.37	11.89	
9/9/2020	12:34	8.83	11.50	
9/9/2020	12:35	7.99	12.32	
Run 2 Average		8.48	11.81	
9/9/2020	12:36	10.03	10.38	
9/9/2020	12:37	10.34	10.47	O2 CO2 Bias
9/9/2020	12:38	3.08	2.47	
9/9/2020	12:39	0.01	0.05	Zero Bias
9/9/2020	12:40	9.18	9.26	
9/9/2020	12:41	10.42	10.53	Span
9/9/2020	12:42	1.44	1.23	
9/9/2020	12:43	-0.03	0.02	Zero
9/9/2020	12:44	0.02	0.77	
9/9/2020	12:45	8.39	11.67	
9/9/2020	12:46	8.49	11.73	
9/9/2020	12:47	8.61	11.74	
9/9/2020	12:48	8.16	11.96	
9/9/2020	12:49	7.83	12.60	
9/9/2020	12:50	8.06	12.22	
9/9/2020	12:51	8.24	12.01	
9/9/2020	12:52	9.05	11.27	
9/9/2020	12:53	8.70	11.59	
9/9/2020	12:54	8.64	11.64	
9/9/2020	12:55	8.68	11.58	
9/9/2020	12:56	8.68	11.71	
9/9/2020	12:57	8.64	11.59	
9/9/2020	12:58	8.00	12.38	
9/9/2020	12:59	8.39	11.81	
9/9/2020	13:00	8.58	11.65	
9/9/2020	13:01	8.76	11.63	
9/9/2020	13:02	8.85	11.46	
9/9/2020	13:03	8.76	11.46	
9/9/2020	13:04	8.78	11.55	
9/9/2020	13:05	8.54	11.72	
9/9/2020	13:06	8.03	12.27	
9/9/2020	13:07	8.21	12.05	
9/9/2020	13:08	8.69	11.53	
9/9/2020	13:09	8.58	11.76	
9/9/2020	13:10	7.97	12.28	
9/9/2020	13:11	8.13	12.12	
9/9/2020	13:12	8.26	12.01	

9/9/2020	13:13	9.44	10.78
9/9/2020	13:14	8.71	11.67
9/9/2020	13:15	8.28	11.97
9/9/2020	13:16	7.84	12.45
9/9/2020	13:17	7.76	12.48
9/9/2020	13:18	9.23	11.10
9/9/2020	13:19	8.38	11.83
9/9/2020	13:20	8.53	11.74
9/9/2020	13:21	7.86	12.49
9/9/2020	13:22	8.27	11.89
9/9/2020	13:23	8.88	11.37
9/9/2020	13:24	8.49	11.79
9/9/2020	13:25	8.74	11.52
9/9/2020	13:26	8.81	11.50
9/9/2020	13:27	8.35	11.88
9/9/2020	13:28	8.79	11.44
9/9/2020	13:29	7.93	12.31
9/9/2020	13:30	8.53	11.71
9/9/2020	13:31	8.62	11.63
9/9/2020	13:32	8.67	11.56
9/9/2020	13:33	8.89	11.35
9/9/2020	13:34	9.09	11.11
9/9/2020	13:35	8.50	11.79
9/9/2020	13:36	8.52	11.72
9/9/2020	13:37	8.73	11.58
9/9/2020	13:38	8.62	11.49
9/9/2020	13:39	8.25	12.03
9/9/2020	13:40	8.62	11.57
9/9/2020	13:41	8.86	11.49
9/9/2020	13:42	8.40	11.86
9/9/2020	13:43	8.64	11.56
9/9/2020	13:44	8.51	11.71
9/9/2020	13:45	8.60	11.63
9/9/2020	13:46	8.38	11.95
9/9/2020	13:47	8.66	11.55
9/9/2020	13:48	9.00	11.27
9/9/2020	13:49	8.31	11.88
9/9/2020	13:50	9.38	10.87
9/9/2020	13:51	8.47	11.73
9/9/2020	13:52	8.47	11.72
9/9/2020	13:53	8.38	12.04
9/9/2020	13:54	7.42	12.77
9/9/2020	13:55	8.30	12.00
9/9/2020	13:56	7.98	12.22
9/9/2020	13:57	8.90	11.28
9/9/2020	13:58	8.64	11.61
9/9/2020	13:59	8.00	12.32

9/9/2020	14:00	8.99	11.10
9/9/2020	14:01	8.40	11.95
9/9/2020	14:02	8.07	12.10
9/9/2020	14:03	8.81	11.46
9/9/2020	14:04	8.46	11.79
9/9/2020	14:05	8.36	11.79
9/9/2020	14:06	9.17	11.08
9/9/2020	14:07	8.67	11.54
9/9/2020	14:08	9.18	11.05
9/9/2020	14:09	8.10	12.26
9/9/2020	14:10	7.61	12.55
9/9/2020	14:11	8.41	11.84
9/9/2020	14:12	9.10	11.10
9/9/2020	14:13	8.58	11.70
9/9/2020	14:14	8.57	11.63
9/9/2020	14:15	7.63	12.60
9/9/2020	14:16	8.32	11.93
9/9/2020	14:17	7.59	12.73
9/9/2020	14:18	8.12	12.01
9/9/2020	14:19	8.88	11.27
9/9/2020	14:20	8.80	11.48
9/9/2020	14:21	8.30	11.99
9/9/2020	14:22	7.85	12.47
9/9/2020	14:23	8.14	12.01
9/9/2020	14:24	8.48	11.78
9/9/2020	14:25	8.25	11.96
9/9/2020	14:26	9.39	10.83
9/9/2020	14:27	9.28	10.95
9/9/2020	14:28	8.02	12.29
9/9/2020	14:29	8.58	11.66
9/9/2020	14:30	8.55	11.59
9/9/2020	14:31	8.18	12.15
9/9/2020	14:32	7.80	12.31
9/9/2020	14:33	8.48	11.75
9/9/2020	14:34	8.34	11.90
9/9/2020	14:35	8.24	11.92
9/9/2020	14:36	8.40	11.88
9/9/2020	14:37	8.85	11.37
9/9/2020	14:38	9.13	11.08
9/9/2020	14:39	8.96	11.28
9/9/2020	14:40	8.48	11.86
9/9/2020	14:41	7.86	12.24
9/9/2020	14:42	8.38	11.91
9/9/2020	14:43	7.92	12.34
9/9/2020	14:44	7.65	12.55
9/9/2020	14:45	8.82	11.45
9/9/2020	14:46	8.72	11.44

9/9/2020	14:47	8.47	11.77	
9/9/2020	14:48	9.19	10.98	
9/9/2020	14:49	9.17	11.00	
9/9/2020	14:50	8.34	12.00	
9/9/2020	14:51	8.43	11.70	
9/9/2020	14:52	8.92	11.35	
Run 3 Average		8.47	11.76	
9/9/2020	14:53	7.81	12.48	
9/9/2020	14:54	8.02	11.36	
9/9/2020	14:55	9.89	10.35	O2 CO2 Bias
9/9/2020	14:56	8.58	8.17	
9/9/2020	14:57	0.01	0.08	Zero Bias
9/9/2020	14:58	1.32	1.90	
9/9/2020	14:59	10.24	10.44	O2 CO2 Bias
9/9/2020	15:00	4.28	4.39	
9/9/2020	15:01	-0.03	0.02	Zero
9/9/2020	15:02	3.61	3.93	
9/9/2020	15:03	10.30	10.52	
9/9/2020	15:04	10.30	10.53	Span
9/9/2020	15:05	17.64	17.70	
9/9/2020	15:06	18.78	18.88	High

Appendix A.2.3
Unit 2 Instrument Strip Charts

SPAN GAS RECORD

CLIENT/LOCATION: Desert View Power
Unit 2

DATE: 9/9/2020
BY: DW

	MID SPAN CYLINDER		HIGH SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO	CC88043	0.00		
O_2	DT0022871	10.48	DT0011386	19.15
CO_2	DT0022871	10.48	DT0011386	18.94

Signature1 : No Sig.
Signature2 : No Sig.
Signature3 : No Sig.

Print Groups : GROUP 4
Print Range : 2020/09/09 07:47:00.000 - 2020/09/09 15:06:44.000
Comment :

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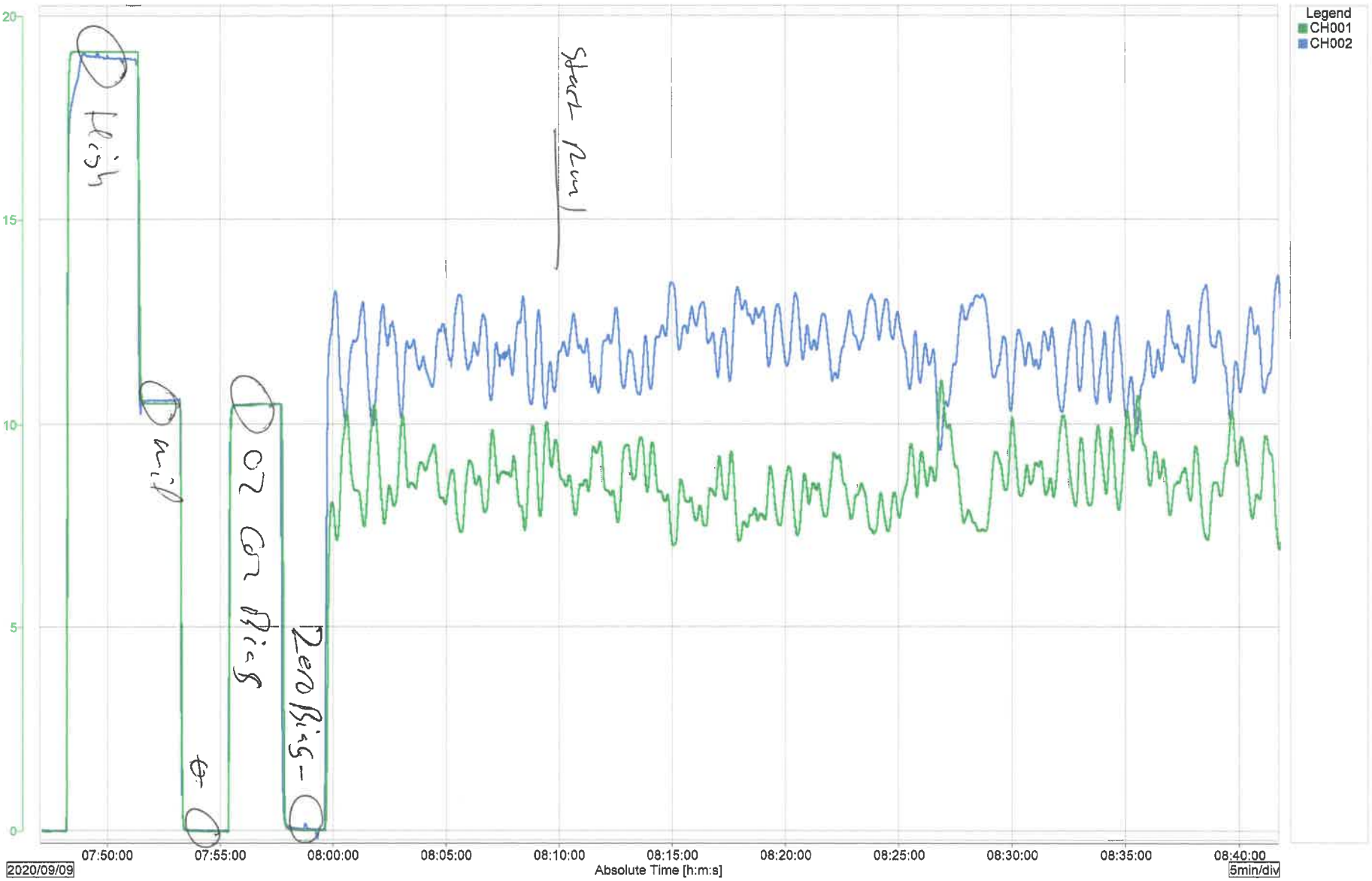
Desert View Power Unit 2 Hot Start



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Signature3 : No Sig.

Print Groups : GROUP 4
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Comment :

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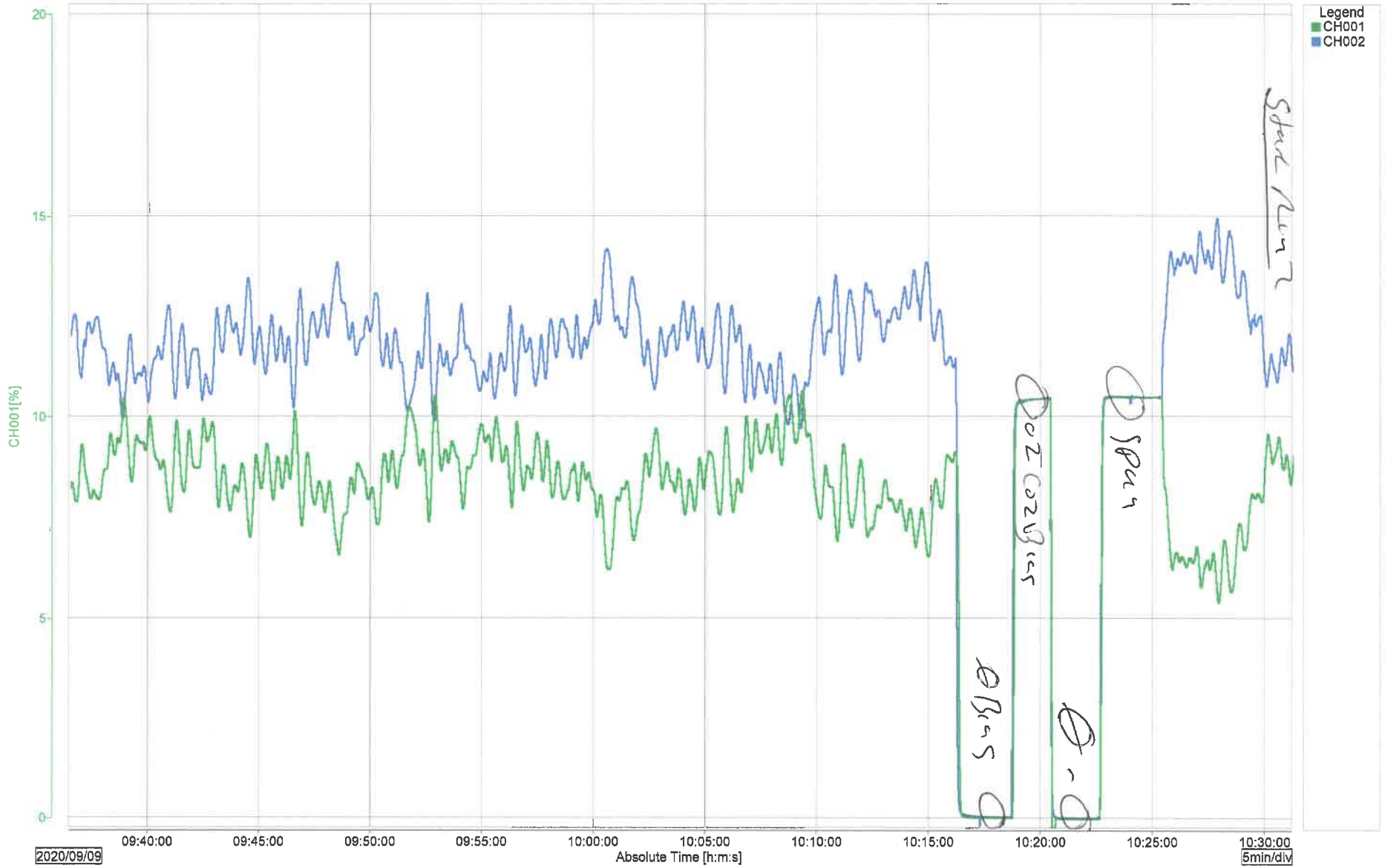
Print Groups : GROUP 4
Print Range : 2020/09/09 07:47:00.000 - 2020/09/09 15:06:44.000
Comment :



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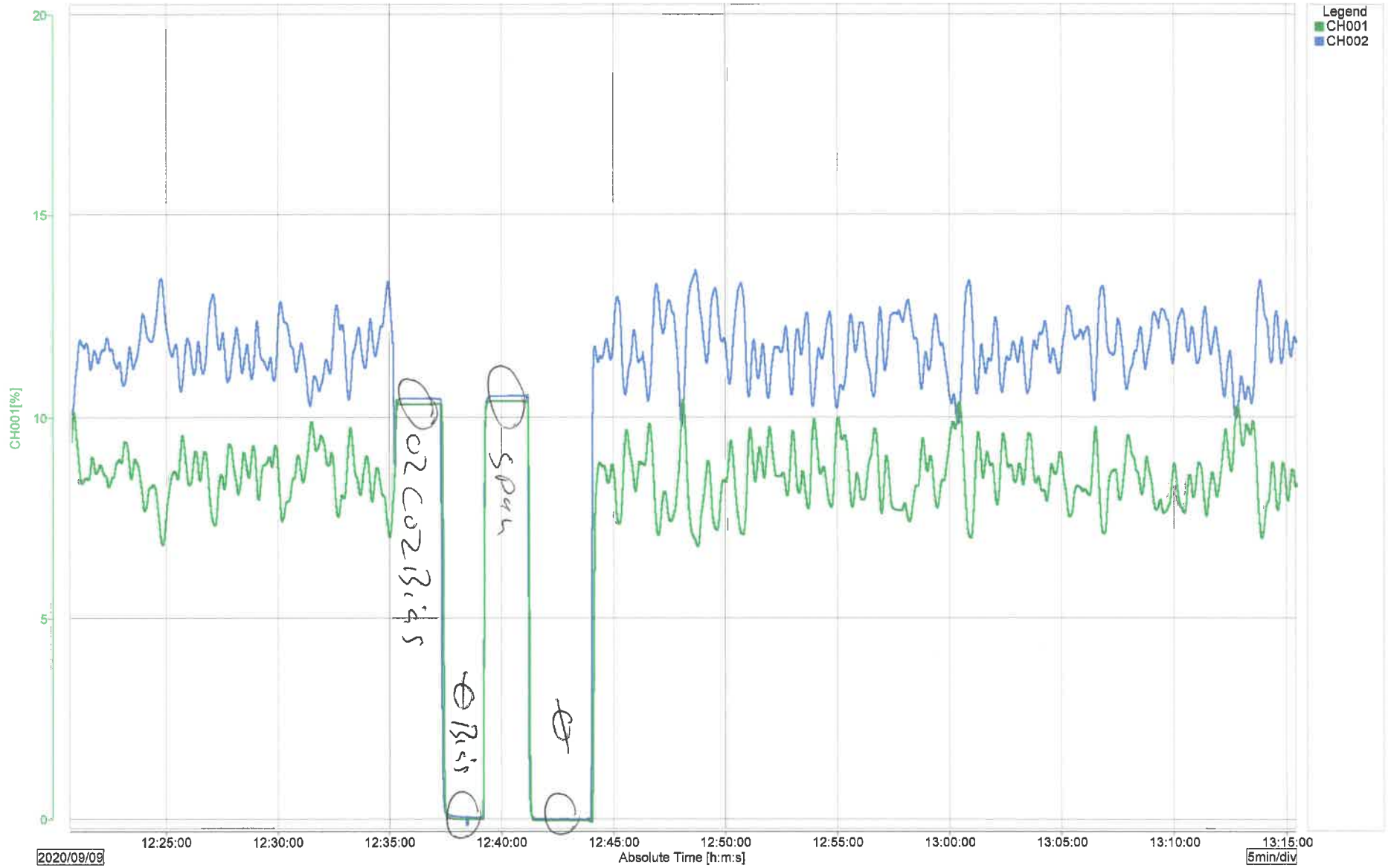
Comment :



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Print Groups : GROUP 4
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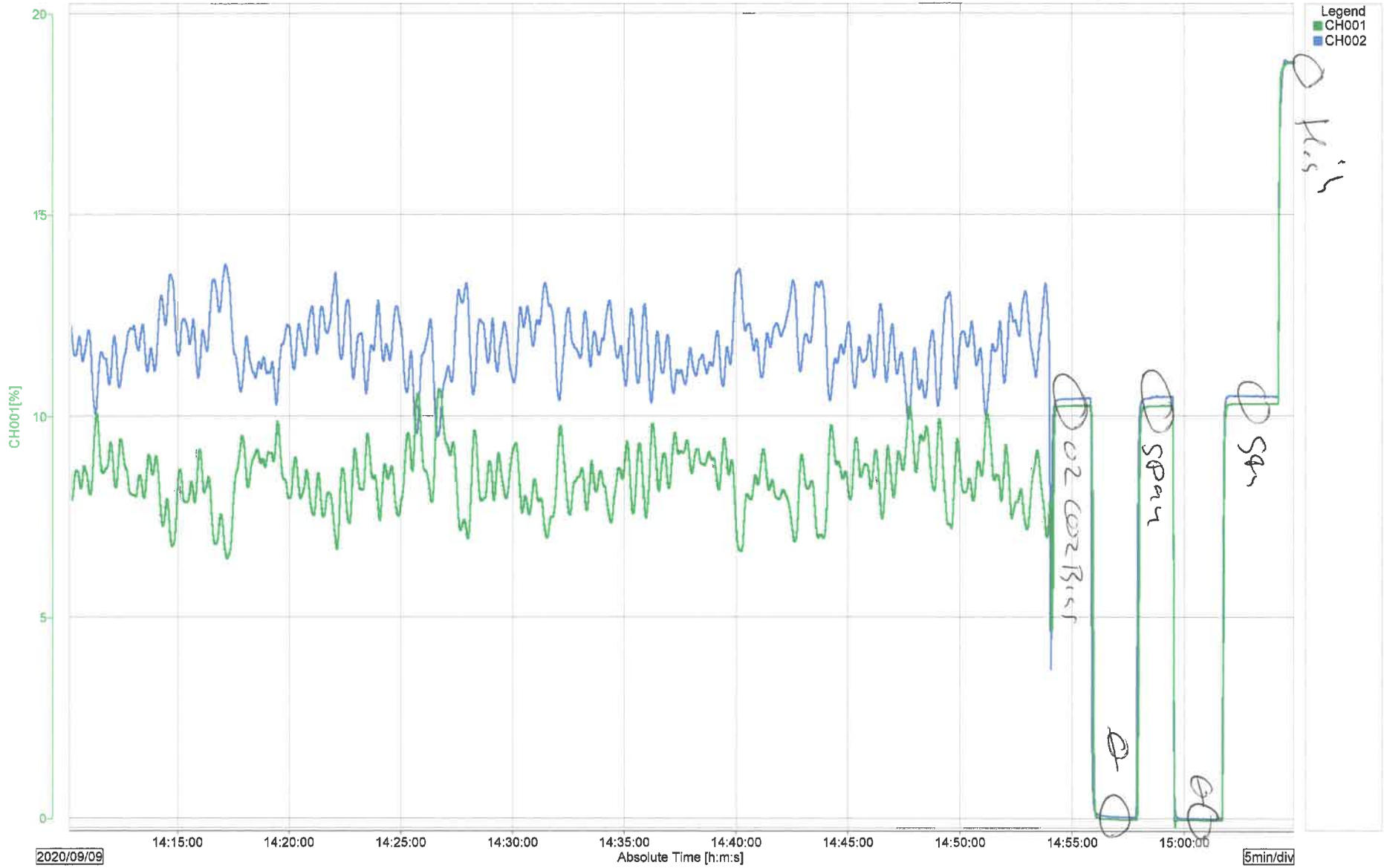

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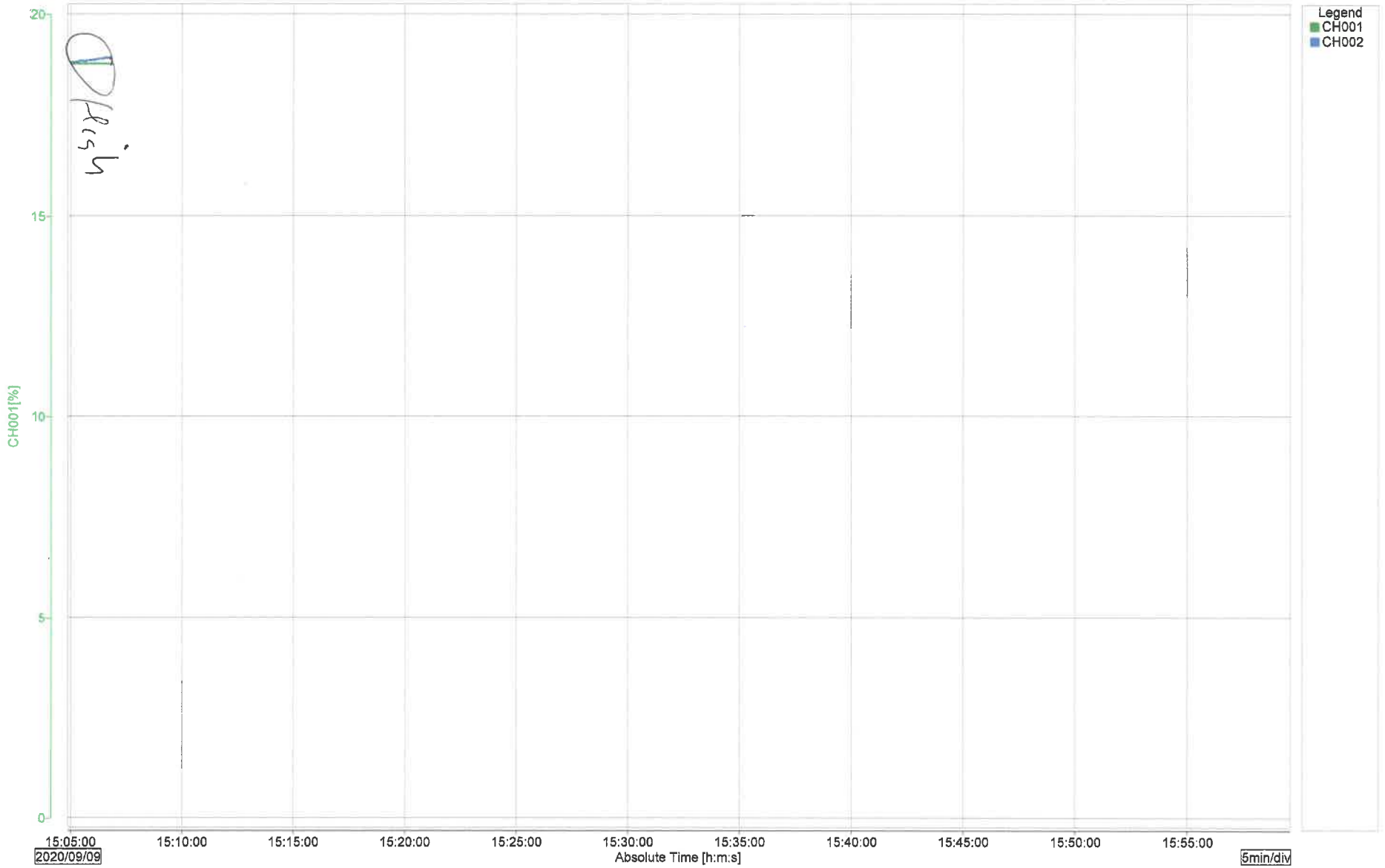

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Appendix A.2.4
Unit 2 Hydrogen Chloride Data

AA MONTP

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 2 Stack Breaching
DATE: 9/ 9 /2020
RUN NO: 1 -HCL-U2
OPERATOR: Patrick Whitman
METER BOX NO: 17-WCS
METER ΔH@: 1.449
METER Yd: 0.984
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: V/V
Silica Gel Expanded, Y/N: no
Filter Condition after Test: ✓
Check Weight: 500.0 / 500.0

AMBIENT TEMPERATURE: 87°F
BAROMETRIC PRESSURE: 30.05
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: 0.005 CFM@ 15 in. Hg.
POST-TEST LEAK RATE: 0.005 CFM@ 15 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	0.1N H2SO4	928.4	674.6	253.8
2	0.1N H2SO4	675.2	668.1	7.1
3	Empty	509.5	508.2	1.3
4	Silica gel	993.9	968.4	25.5
	Rinse		50	-50
	Total:			237.7

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	0810	182.100	1.0	1.1	375	253	254	50	84	86	5"		+.30
4	0814	184.725	.98	1.1	376	255	258	50	84	87	5"		
3	0818	187.330	.93	1.0	376	254	259	50	84	86	5"		
2	0822	189.885	.95	1.0	374	256	255	49	84	86	5"		
1	0826	192.150	.97	1.1	375	254	257	48	83	85	5"		
P.C.	0830	194.634											
5	0831	194.634	1.2	1.3	373	255	251	48	83	85	5"		
4	0835	197.555	1.3	1.4	374	256	253	48	86	87	5"		
3	0839	200.000	1.2	1.3	373	258	256	48	86	88	5"		
2	0843	202.875	1.0	1.1	372	255	253	44	87	88	5"		
1	0847	205.280	.93	1.0	375	251	254	45	88	89	5"		
P.C.	0851	207.747											
5	0852	207.747	.90	1.0	373	254	253	44	88	89	5"		
4	0856	210.330	.85	.98	372	256	255	45	89	90	5"		
3	0900	212.600	.83	.99	373	255	256	45	89	90	5"		
2	0904	215.025	.80	.96	372	254	258	46	88	91	5"		
1	0908	217.380	.84	1.0	373	252	257	46	89	91	5"		
Average	P.C. 0912	219.893											

Comments: Factor @ 0800=1.1 / @ 0848=1.15 / @ 0858=1.2 TV = 716.8

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 2 Stack Breaching
DATE: 9/ 9 /2020
RUN NO: 1 -HCL-U2
OPERATOR: Patrick Whitman
METER BOX NO: 17-WCS
METER ΔH@: 1.449
METER Yd: 0.984
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test:
Silica Gel Expanded, Y/N:
Filter Condition after Test: Gel Pg 1
Check Weight:

AMBIENT TEMPERATURE: Gel Pg 1
BAROMETRIC PRESSURE:
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: _____ CFM@ _____ in. Hg.
POST-TEST LEAK RATE: _____ CFM@ _____ in. Hg.
PITOT LEAK CHECK - PRE: _____ POST: _____
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	O.1N H2SO4			
2	O.1N H2SO4			
3	Empty			Pg 1
4	Silica gel	Gel Pg 1		
	Rinse		50	
	Total:			

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	0913	219.843	1.0	1.2	373	254	255	47	90	92	5"		+.30
4	0917	222.525	1.1	1.3	374	256	255	48	91	93	5"		
3	0921	225.180	.98	1.2	375	253	254	48	92	93	5"		
2	0925	227.885	.94	1.1	373	252	256	50	93	94	5"		
1	0929	230.515	.90	1.1	374	252	251	51	93	95	5"		
P.C.	0933	233.128											
5	0935	233.128	1.1	1.3	373	254	250	51	92	95"	5"		
4	0939	235.880	1.2	1.5	374	255	254	52	93	95"	5"		
3	0943	238.840	1.1	1.4	372	252	258	52	94	96	5"		
2	0947	241.770	1.1	1.4	373	254	254	53	95	96	5"		
1	0951	244.675	1.0	1.3	374	255	254	53	96	97	5"		
P.C.	0955	247.464											
5	0956	247.464	1.0	1.3	376	254	257	54	95	97	5"		
4	1000	250.365	1.1	1.4	375	256	255	55	96	97	5"		
3	1004	253.170	1.2	1.5	374	257	254	56	96	97	5"		
2	1008	256.200	1.1	1.4	373	255	256	57	97	98	5"		
1	1012	259.065	1.0	1.3	373	254	255	58	98	98	5"		
Average	1016	261.864	1.013	1.201	373.7				70.9				

Comments: Factor @ 0937 = 1.25

DS834049

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 2 Stack Breaching
DATE: 9/ 9 /2020
RUN NO: 2 -HCL-U2
OPERATOR: Patrick Whitman
METER BOX NO: 17-WCS
METER ΔH@: 1.449
METER Yd: 0.984
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: ✓/✓
Silica Gel Expanded, Y/N: no
Filter Condition after Test: ✓
Check Weight: 500.0 / 500.0

AMBIENT TEMPERATURE: 103°F
BAROMETRIC PRESSURE: 30.03
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: 0.005 CFM@ 15 in. Hg.
POST-TEST LEAK RATE: 0.005 CFM@ 15 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	0.1N H2SO4	985.4	762.7	222.7
2	0.1N H2SO4	788.1	754.8	33.3
3	Empty	655.0	653.4	1.6
4	Silica gel	1033.4	1009.4	23.7
	Rinse		50	-.5
	Total:			231.3

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	1030	264.500	1.0	1.3	375	251	253	50	101	100	5"		+.30
4	1034	267.300	1.1	1.4	374	252	254	44	102	103	5"		
3	1038	270.275	1.2	1.5	374	251	254	43	103	104	5"		
2	1042	273.280	1.1	1.4	374	252	255	43	103	105	5"		
1	1046	276.255	1.0	1.3	373	251	256	43	103	105	5"		
P.C.	1050	279.051											
5	1051	279.051	1.1	1.4	372	253	254	44	104	106	5"		
4	1055	282.070	1.2	1.5	373	254	257	44	104	106	5"		
3	1059	285.140	1.0	1.3	373	256	254	45	104	106	5"		
2	1103	288.000	1.1	1.3	374	258	255	45	103	107	5"		
1	1107	290.780	1.0	1.2	373	258	257	46	103	106	5"		
P.C.	1111	293.572											
5	1112	293.572	1.0	1.2	374	255	252	47	104	106	5"		
4	1116	296.400	.98	1.2	375	254	253	47	103	105	5"		
3	1120	299.185	.95	1.1	373	256	253	46	104	106	5"		
2	1124	301.790	.93	1.1	372	258	254	46	104	106	5"		
1	1128	304.365	.90	1.0	373	257	252	46	104	106	5"		
Average	P.C. 1118	306.857											

Comments: Factor @ 1030 = 1.25 / @ 1102 = 1.2

TU = ~~657.1~~ 666.4

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 2 Stack Breaching
DATE: 9/ 9 /2020
RUN NO: 2 -HCL-U2
OPERATOR: Patrick Whitman
METER BOX NO: 17-WCS
METER ΔH@: 1.449
METER Yd: 0.984
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: PW
Silica Gel Expanded, Y/N: PW
Filter Condition after Test: SAR
Check Weight: _____

AMBIENT TEMPERATURE: See Pg 1
BAROMETRIC PRESSURE: _____
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: _____ CFM@ _____ in. Hg.
POST-TEST LEAK RATE: _____ CFM@ _____ in. Hg.
PITOT LEAK CHECK - PRE: _____ POST: _____
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	0.1N H2SO4			
2	0.1N H2SO4			
3	Empty		PW	
4	Silica gel	See PW		
	Rinse		50	
	Total:			

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	1133	306.857	.92	1.1	373	254	256	45	104	107	5"		1.30
4	1137	309.470	.87	1.0	374	255	257	45	104	106	5"		
3	1141	311.925	.85	1.0	374	256	251	45	104	106	5"		
2	1145	314.360	.82	.98	375	252	252	44	105	106	5"		
1	1149	316.820	.80	.96	374	255	253	45	105	106	5"		
P.C.	1153	319.262											
5	1154	319.262	1.2	1.4	373	254	252	46	105	107	5"		
4	1158	322.160	1.3	1.6	374	256	253	47	105	107	5"		
3	1202	325.275	1.1	1.3	375	258	255	47	105	107	5"		
2	1206	328.470	1.0	1.2	375	256	254	47	104	107	5"		
1	1210	331.015	.94	1.1	374	252	256	48	104	106	5"		
P.C.	1214	333.524											
5	1215	333.524	1.1	1.3	372	254	258	49	104	106	5"		
4	1219	336.410	1.0	1.2	373	255	257	49	104	106	5"		
3	1223	339.350	1.0	1.2	373	256	254	49	103	106	5"		
2	1227	341.955	1.1	1.3	374	257	25[illegible]	50	104	107	5"		
1	1231	344.840	.95	1.1	375	258	257	50	104	108	5"		
Average	END 1235	347.391	1.013	1.231	373.7				104.8				

Comments: _____

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 2 Stack Breaching
DATE: 9/ 9 /2020
RUN NO: 3 -HCL-U2
OPERATOR: Patrick Whitman
METER BOX NO: 17-WCS
METER ΔH@: 1.449
METER Yd: 0.984
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test: √/√
Silica Gel Expanded, Y/N: no
Filter Condition after Test: √
Check Weight: 500.0/500.0

AMBIENT TEMPERATURE: 104°F
BAROMETRIC PRESSURE: 30.05
ASSUMED MOISTURE: 12.5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: 0.005 CFM@ 15 in. Hg.
POST-TEST LEAK RATE: 0.005 CFM@ 15 in. Hg.
PITOT LEAK CHECK - PRE: √ POST: √
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	0.1N H2SO4	936.6	692.6	244.0
2	0.1N H2SO4	717.2	704.8	12.4
3	Empty	510.0	507.1	2.9
4	Silica gel	955.1	921.7	33.4
	Rinse		50	50
	Total:			342.7

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	1247	350.400	1.1	1.3	373	254	252	43	105	108	5"		-.30
4	1251	353.375	1.2	1.4	372	255	253	44	105	108	5"		
3	1255	356.200	1.0	1.2	374	256	257	44	106	108	5"		
2	1259	358.940	1.0	1.2	375	257	255	44	105	107	5"		
1	1303	361.725	.95	1.1	373	258	255	44	104	107	5"		
P.C.	1307	364.284											
5	1308	364.284	1.2	1.4	376	255	253	44	104	106	5"		
4	1312	367.250	1.1	1.3	378	254	255	44	105	107	5"		
3	1316	370.115	1.1	1.3	379	255	254	44	106	108	5"		
2	1320	372.975	.97	1.2	380	254	256	45	106	108	5"		
1	1324	375.780	.94	1.1	381	255	257	45	107	109	5"		
P.C.	1328	378.413											
5	1329	378.413	.89	1.1	382	254	256	46	107	109	5"		
4	1333	381.120	.87	1.0	383	255	257	47	108	110	5"		
3	1337	383.635	.85	1.0	382	255	254	47	107	110	5"		
2	1341	386.270	.83	.99	381	254	257	48	107	110	5"		
1	1345	388.765	.85	1.0	382	253	258	48	107	110	5"		
Average	P.C. 1349	391.276											

Comments: Factor @ 1245 = 1.2

FV = 693.4

AA MONTR

WET CHEMICAL SAMPLING SYSTEM DATA AND WORKSHEET – STANDARD

CLIENT: Desert View Power
LOCATION: Unit 2 Stack Breaching
DATE: 9/ 9 /2020
RUN NO: 3 -HCL-U2
OPERATOR: Patrick Whitman
METER BOX NO: 17-WCS
METER ΔH@: 1.449
METER Yd: 0.984
STACK AREA, FT²: 38.8
TRAVERSE POINTS, MIN/POINT: 4x30
ΔH= _____ X ΔP:
Probe Condition, pre/post test:
Silica Gel Expanded, Y/N:
Filter Condition after Test:
Check Weight:

AMBIENT TEMPERATURE: Pg 1
BAROMETRIC PRESSURE: 42.5
ASSUMED MOISTURE: 5
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: # 75 Glass
PROBE LENGTH: 6'
NOZZLE ID NO/ MATERIAL: DVP #1 Glass
NOZZLE DIAMETER: 0.221
FILTER NO/TYPE: Teflon Mat
PRE-TEST LEAK RATE: _____ CFM@ _____ in. Hg.
POST-TEST LEAK RATE: _____ CFM@ _____ in. Hg.
PITOT LEAK CHECK - PRE: _____ POST: _____
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER PW
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	= Difference
1	O.1N H2SO4			
2	O.1N H2SO4			
3	Empty			
4	Silica gel	See Pg 1		
	Rinse		50	
	Total:			

Point	Time	Meter Volume, ft³	ΔP in. H₂O	ΔH in. H₂O	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F	Imp. Out Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Vacuum in. Hg.	O₂ %	P. static in. H₂O
5	1350	391.276	1.2	1.4	380	254	255	49	107	109	5"		F.30
4	1354	394.330	1.1	1.3	381	255	253	50	106	108	5"		
3	1358	397.125	1.0	1.2	382	254	256	51	106	109	5"		
2	1402	399.860	.97	1.2	382	256	257	51	107	110	5"		
1	1406	402.593	.94	1.1	383	257	251	52	106	109	5"		
P.C.	1410	405.148											
5	1411	405.148	1.0	1.2	381	258	255	52	106	110	5"		
4	1415	407.765	1.1	1.3	382	257	254	52	106	110	5"		
3	1419	410.390	1.0	1.2	383	255	252	52	105	109	5"		
2	1423	413.275	1.1	1.3	384	254	253	54	106	110	5"		
1	1427	415.920	.98	1.2	383	255	252	54	106	111	5"		
P.C.	1431	418.703											
5	1432	418.703	1.1	1.3	385	256	253	56	107	111	5"		
4	1436	421.520	1.2	1.4	383	252	254	56	106	110	5"		
3	1440	424.485	1.1	1.3	384	255	253	56	106	110	5"		
2	1444	427.415	1.1	1.3	385	254	256	57	106	111	5"		
1	1448	430.125	1.0	1.2	384	255	257	57	107	111	5"		
Average	END 1452	432.917	1.0218	1.216	384.7				107.6				

Comments: _____

1-HCL-U2							2-HCL-U2							3-HCL-U2						
	dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm	
5	1.00	1.000	1.10	375	84	86	5	1.00	1.000	1.30	375	101	100	5	1.10	1.049	1.30	373	105	108
4	0.98	0.990	1.10	376	84	87	4	1.10	1.049	1.40	374	102	103	4	1.20	1.095	1.40	372	105	108
3	0.93	0.964	1.00	376	84	86	3	1.20	1.095	1.50	374	103	104	3	1.00	1.000	1.20	374	106	108
2	0.95	0.975	1.00	374	84	86	2	1.10	1.049	1.40	374	103	105	2	1.00	1.000	1.20	375	105	107
1	0.97	0.985	1.10	375	83	85	1	1.00	1.000	1.30	373	103	105	1	0.95	0.975	1.10	373	104	107
5	1.20	1.095	1.30	373	83	85	5	1.10	1.049	1.40	372	104	106	5	1.20	1.095	1.40	375	104	106
4	1.30	1.140	1.40	374	86	87	4	1.20	1.095	1.50	373	104	106	4	1.10	1.049	1.30	378	105	107
3	1.20	1.095	1.30	373	86	88	3	1.00	1.000	1.30	373	104	106	3	1.10	1.049	1.30	379	106	108
2	1.00	1.000	1.10	372	87	88	2	1.10	1.049	1.30	374	103	107	2	0.97	0.985	1.20	380	106	108
1	0.93	0.964	1.00	373	88	89	1	1.00	1.000	1.20	373	103	106	1	0.94	0.970	1.10	381	107	109
5	0.90	0.949	1.00	373	88	89	5	1.00	1.000	1.20	374	104	106	5	0.89	0.943	1.10	382	107	109
4	0.85	0.922	0.98	372	89	90	4	0.98	0.990	1.20	375	103	105	4	0.87	0.933	1.00	383	108	110
3	0.83	0.911	0.99	373	89	90	3	0.95	0.975	1.10	373	104	106	3	0.85	0.922	1.00	382	107	110
2	0.80	0.894	0.96	372	88	91	2	0.93	0.964	1.10	372	104	106	2	0.83	0.911	0.99	381	107	110
1	0.84	0.917	1.00	373	89	91	1	0.90	0.949	1.00	373	104	106	1	0.85	0.922	1.00	382	107	110
5	1.00	1.000	1.20	373	90	92	5	0.92	0.959	1.10	373	104	107	5	1.20	1.095	1.40	380	107	109
4	1.10	1.049	1.30	374	91	93	4	0.87	0.933	1.00	374	104	106	4	1.10	1.049	1.30	381	106	108
3	0.98	0.990	1.20	375	92	93	3	0.85	0.922	1.00	374	104	106	3	1.00	1.000	1.20	382	106	109
2	0.94	0.970	1.10	373	93	94	2	0.82	0.906	0.98	375	105	106	2	0.97	0.985	1.20	382	107	110
1	0.90	0.949	1.10	374	93	95	1	0.80	0.894	0.96	374	105	106	1	0.94	0.970	1.10	383	106	109
5	1.10	1.049	1.30	373	92	95	5	1.20	1.095	1.40	373	105	107	5	1.00	1.000	1.20	381	106	110
4	1.20	1.095	1.50	374	93	95	4	1.30	1.140	1.60	374	105	107	4	1.10	1.049	1.30	382	106	110
3	1.10	1.049	1.40	372	94	96	3	1.10	1.049	1.30	375	105	107	3	1.00	1.000	1.20	383	105	109
2	1.10	1.049	1.40	373	95	96	2	1.00	1.000	1.20	375	104	107	2	1.10	1.049	1.30	384	106	110
1	1.00	1.000	1.30	374	96	97	1	0.94	0.970	1.10	374	104	106	1	0.98	0.990	1.20	383	106	111
5	1.00	1.000	1.30	376	95	97	5	1.10	1.049	1.30	372	104	106	5	1.10	1.049	1.30	385	107	111
4	1.10	1.049	1.40	375	96	97	4	1.00	1.000	1.20	373	104	106	4	1.20	1.095	1.40	383	106	110
3	1.20	1.095	1.50	374	96	97	3	1.00	1.000	1.20	373	103	106	3	1.10	1.049	1.30	384	106	110
2	1.10	1.049	1.40	373	97	98	2	1.10	1.049	1.30	374	104	107	2	1.10	1.049	1.30	385	106	111
1	1.00	1.000	1.30	373	98	98	1	0.95	0.975	1.10	375	104	108	1	1.00	1.000	1.20	384	107	111
Average		1.0130	1.201	373.7	90.9		Average		1.0136	1.231	373.7	104.8		Average		1.0218	1.216	380.4	107.6	

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.013	182.100	928.4	674.6	253.8
Meter Pressure (iwg)	1.201	261.864	675.2	668.1	7.1
Stack Temperature (F)	373.667	79.764	509.5	508.2	1.3
Meter Temperature (F)	90.900		993.9	968.4	25.5
Meter Volume (acf)	79.764			50	-50.0
Liquid Volume (ml)	237.700				237.7

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.014	264.5	985.4	762.7	222.7
Meter Pressure (iwg)	1.231	347.391	788.1	754.8	33.3
Stack Temperature (F)	373.667	82.891	655.0	653.4	1.6
Meter Temperature (F)	104.800		1033.1	1009.4	23.7
Meter Volume (acf)	82.891			50	-50.0
Liquid Volume (ml)	231.300				231.3

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.022	350.4	936.6	692.6	244.0
Meter Pressure (iwg)	1.216	432.917	717.2	704.8	12.4
Stack Temperature (F	380.400	82.517	510.0	507.1	2.9
Meter Temperature (F)	107.583		955.1	921.7	33.4
Meter Volume (acf)	82.517			50	-50.0
Liquid Volume (ml)	242.7				242.7

Appendix A.3
Laboratory Reports

Appendix A.3.1
Hydrogen Chloride Laboratory Data

Atmospheric Analysis & Consulting, Inc.

Client	: Montrose Air Quality Services
Client Project Name	: Desert View Power
Client Project No.	: 002AS-789048
AAC Project No.	: 201644 Rev 1
Reporting Date	: 09/16/2020

On September 11, 2020, Atmospheric Analysis & Consulting, Inc. received nine (9) liquid samples for HCl analysis by EPA Method 26A. Upon receipt each sample was assigned a unique Laboratory ID number as follows:

Client Sample ID	AAC Sample ID	Client Sample ID	AAC Sample ID
1-HCL-U1	201644-12306	3-HCL-U2	201644-12311
2-HCL-U1	201644-12307	Reagent Blank-HCL DI H_2O	201644-12312
3-HCL-U1	201644-12308	Reagent Blank-HCL 0.1N H_2SO_4	201644-12313
1-HCL-U2	201644-12309	Field Blank	201644-12314
2-HCL-U2	201644-12310		

This analysis is performed in accordance with AAC's Quality Manual. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

Per clients request the report was revised on 09/16/2020 to include the total sample volumes provided by the client.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples. The Technical Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

Sucha Parmar
Technical Director

This report consists of 5 pages.

2225 Sperry Ave., Ventura, CA 93003 www.aaclab.com • (805) 650-1642

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

Anion Analysis by IC

Client	: Montrose Air Quality Services	Sampling Dates	: 09/09-10/2020
Client Project Name	: Desert View Power	Receiving Date	: 09/11/2020
AAC Project No.	: 201644 Rev 1	Analysis Date	: 09/14-15/2020
Analyst	: JD/RS	Reporting Date	: 09/16/2020

HCl Analysis by EPA Method 26A

Client Sample ID	AAC Sample ID	Sample Volume (mL)	Analysis DF	HCl (mg/ml)	HCl (mg/sample)	SRL (mg/sample)
1-HCL-U1	201644-12306	716.8	5	0.055	39.4	0.369
2-HCL-U1	201644-12307	666.4	5	0.059	39.4	0.343
3-HCL-U1	201644-12308	693.4	5	0.051	35.3	0.357
1-HCL-U2	201644-12309	710.7	5	0.076	54.0	0.365
2-HCL-U2	201644-12310	706.2	5	0.063	44.3	0.363
3-HCL-U2	201644-12311	684.3	5	0.083	57.2	0.352
Reagent Blank-HCL DI H2O	201644-12312	130	5	<SRL	<SRL	0.067
Reagent Blank-HCL 0.1N H2SO4	201644-12313	203	5	<SRL	<SRL	0.104
Field Blank	201644-12314	415.1	5	<SRL	<SRL	0.213

<SRL-compound was analyzed for but not detected at or above the SRL (Sample Reporting Limit)

SRL (ug/sample) =Method Reporting Limit (MRL) (0.100 ug/mL) x Sample Volume (mL) x Analysis Dilution Factor x Method Dilution Factor

Sucha Parmar, PhD
Technical Director

2225 Sperry Ave., Ventura, CA 93003 www.aaclab.com • (805) 650-1642

Quality Control/Quality Assurance Report

EPA 26A

Analysis Date : 09/14-15/2020
Analyst : JD
Instrument ID : DIONEX IC # 1

Calibration Verification of the 01/22/2020 Calibration

Sample ID	Analyte	Target Concentration (ug/mL)	Measured Concentration (ug/mL)	Percent Recovery (%)*
Opening CV	Fluoride	25.0	24.0	96.0
	Chloride	25.0	24.5	98.0
Continuing CV	Fluoride	25.0	24.8	99.3
	Chloride	25.0	26.8	107
Continuing CV	Fluoride	25.0	24.6	98.3
	Chloride	25.0	25.6	102
Continuing CV	Fluoride	25.0	25.4	102
	Chloride	25.0	26.7	107
Closing CV	Fluoride	25.0	25.3	101
	Chloride	25.0	26.4	106
Second Source	Fluoride	25.0	26.3	105
	Chloride	25.0	26.8	107

* Must be 85-115%

Sucha Parmar, Ph.D.
Technical Director

2225 Sperry Ave., Ventura, CA 93003 www.aaclab.com • (805) 650-1642

Atmospheric Analysis & Consulting, Inc.

QUALITY CONTROL/ASSURANCE REPORT

EPA 26A

Analysis Date : 09/14-15/2020
Analyst : JD
Instrument ID : DIONEX IC # 1

Method Blank Analysis

Analyte	Concentration (ug/mL)	Reporting Limit (ug/mL)
Fluoride	<SRL	0.100
Chloride	<SRL	0.100

Laboratory Control Spike Analysis

Analyte	Sample Concentration (ug/mL)	Spike Concentration (ug/mL)	Lab Spike Concentration (ug/mL)	Duplicate Lab Spike Concentration (ug/mL)	Spike Recovery (%)**	Duplicate Spike Recovery (%)**	% RPD****
Fluoride	0.000	12.5	12.0	12.0	95.7	96.1	0.4
Chloride	0.000	12.5	12.0	12.6	95.9	101	4.7

Matrix Spike Analysis (201644-12309x5)

Analyte	Sample Concentration (ug/mL)	Spike Concentration (ug/mL)	Matrix Spike Concentration (ug/mL)	Duplicate Matrix Spike Concentration (ug/mL)	Spike Recovery (%)***	Duplicate Spike Recovery (%)***	% RPD****
Fluoride	0.000	12.5	11.5	12.2	91.8	97.7	6.3
Chloride	7.39	12.5	20.0	19.7	101	98.9	2.4

Matrix Spike Analysis (201603-12071)

Analyte	Sample Concentration (ug/mL)	Spike Concentration (ug/mL)	Matrix Spike Concentration (ug/mL)	Duplicate Matrix Spike Concentration (ug/mL)	Spike Recovery (%)***	Duplicate Spike Recovery (%)***	% RPD****
Fluoride	0.000	12.5	11.5	12.0	92.3	95.6	3.6
Chloride	0.000	12.5	12.0	11.4	96.0	90.8	5.5

Duplicate Sample Analysis

Sample ID	Analyte	Result (ug/mL)	Duplicate Result (ug/mL)	%RPD *	DF
201644-12308	Fluoride	<SRL	<SRL	NA	5
	Chloride	49.9	49.2	1.5	5
201644-12311	Fluoride	<SRL	<SRL	NA	5
	Chloride	80.4	82.0	2.0	5
201603-12072	Fluoride	<SRL	<SRL	NA	1
	Chloride	<SRL	<SRL	NA	1

* Must be <10%
** Must be 85-115%
*** Must be 75-125%
**** Must be < 25%

Sucha Parmar, Ph.D.
Technical Director

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Appendix A.3.2
Fuel Analysis Data

	Fuel Sample 2006079										Fuel Sample 2006080									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Chlorine %	0.139	0.12	0.12	0.045	0.083	0.134	0.43	0.173	0.141	0.161	0.189	0.16	0.043	0.036	0.122	0.119	0.317	0.083	0.023	0.209
Water-Solule Chlorine %	0.117	0.003	0.002	0.039	0.61	0.93	0.03	0.104	0.052	0.028	0.012	0.041	0.014	0.015	0.01	0.026	0.059	0.021	0.022	0.05
Water-Insoluble Chlorine %	0.22	0.117	0.118	0.006	0.022	0.41	0.013	0.069	0.088	0.132	0.177	0.12	0.029	0.021	0.111	0.093	0.258	0.063	0.001	0.159
HCL mg/kg	0.156	0.135	0.13	0.22	0.105	0.108	0.149	0.236	0.167	0.145	0.164	0.206	0.222	0.21	0.217	0.146	0.199	0.252	0.19	0.121
Gross Calorific Value (BTU/lb)	6280	6510	5640	5430	7060	6710	6260	6580	6810	6990	6360	6600	6360	6440	6470	7000	7310	5980	5280	6620
Gross Calorific Value (dry) BTU/lb	8130	8860	7160	6810	8760	8500	7970	8220	8430	8570	8150	8300	8160	8200	8600	8790	9320	8250	6540	7430
Chloride %	0.19	0.16	0.05	0.17	0.19	0.19	0.17	0.17	0.19	0.14	0.09	0.1	0.17	0.13	0.16	0.14	0.15	0.15	0.1	0.17
pH	6.368	6.432	6.449	6.22	6.539	6.53	6.388	6.188	6.339	6.4	6.346	6.248	6.215	6.24	6.226	6.396	6.262	6.16	6.282	6.478
Mercury mg/kg	0.035	0.045	0.056	0.034	0.078	0.097	0.035	0.04	ND	0.033	0.037	0.039	0.036	0.049	0.13	0.036	0.045	0.045	0.039	0.032
Potassium mg/kg	3580	3690	3710	3940	4440	3840	4480	4160	4520	4910	3840	4070	4160	3960	3980	3480	4750	3660	3930	4160
Sodium mg/kg	1730	1470	1620	1790	2640	1720	1550	1340	1450	2190	1460	1680	1760	1540	1320	1390	1530	1340	1280	1230
ASTM E1755-01																				
Ash %	24.7	18.6	10.1	16.4	14.2	14.8	20.1	18	11.5	16.9	18.4	17.7	8.6	11.3	10.9	6.53	8.18	11.7	15.7	16.9
Ultimate Analysis																				
Moisture %	22.8	26.5	21.3	20.2	19.4	21.1	21.5	19.9	19.2	18.4	21.9	20.5	22.1	21.5	24.7	20.4	21.6	27.5	19.2	10.8
Ash %	24.7	18.6	10.1	16.4	14.2	14.8	20.1	18	11.5	16.9	18.4	17.7	8.6	11.3	10.9	6.53	8.18	11.7	15.7	16.9
Oxygen %	26.2	33.7	39.6	35.2	38	37.2	29.2	33.3	56.1	43.1	31.3	35.8	44.1	46.5	36.4	46.4	44.6	42.8	30.6	32.4
Sulfur %	0.19	0.17	0.02	0.22	0.12	0.12	0.17	0.19	0.12	0.13	0.05	0.09	0.1	0.1	0.1	0.09	0.1	0.08	0.14	0.11

Wood samples

Date	Time	HHV (dry)	Unit
9/10/2020		8,650	1
9/10/2020		7,870	
9/10/2020		8,220	
9/10/2020		7,700	
9/10/2020		7,400	
9/10/2020		7,440	
9/10/2020		8,760	
9/10/2020		8,250	
9/10/2020		7,620	
9/10/2020		8,660	
9/10/2020		8,210	
9/10/2020		7,800	
9/10/2020			
9/10/2020			
Average		8,048	

Date	Time	HHV (dry)	Unit
9/9/2020		8,330	2
9/9/2020		8,570	
9/9/2020		7,890	
9/9/2020		7,770	
9/9/2020		7,150	
9/9/2020		7,460	
9/9/2020		7,300	
9/9/2020		7,840	
9/9/2020			
9/9/2020			
9/9/2020			
9/9/2020			
9/9/2020			
9/9/2020			
Average		7,789	

Appendix A.3.3
Sample Chain of Custody

201644

CHAIN OF CUSTODY

CLIENT: Desert View Power PROJECT NO: 002AS-789048 TEST DATE(S): September 9 and 10, 2020

LOCATION: Unit 1 and Unit 2 SAMPLER(S): Patrick Whitman

SAMPLE LOCATION: Stack Breaching PROJECT MANAGER: Dave Wonderly

TEST METHOD(S): EPA 26A DATE DUE: ASAP

OUTSIDE LAB REQUIRED?: Yes COMPLIANCE TEST? Yes

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
9/10/2020	810/1016	1-HCL-U1	Impinger contents and Line rinse	12306 1	PW	TV= 716.8
9/10/2020	1030/1235	2-HCL-U1	Impinger contents and Line rinse	12307 1	PW	TV= 666.4
9/10/2020	1247/1452	3-HCL-U1	Impinger contents and Line rinse	12308 1	PW	TV= 693.4
9/9/2020	553/758	1-HCL-U2	Impinger contents and Line rinse	12309 1	PW	TV= 710.7
9/9/2020	822/1027	2-HCL-U2	Impinger contents and Line rinse	12310 1	PW	TV= 706.2
9/9/2020	1230/1435	3-HCL-U2	Impinger contents and Line rinse	12311 1	PW	TV= 684.7
9/9/2020	1500	Reagent Blank-HCL	100 ML, DI H_2O	12312 1	DW	
9/9/2020	1500	Reagent Blank-HCL	200 ml 0.1 N, H_2SO_4	12313 1	DW	
9/9/2020	1530	Field Blank	Impinger contents and Line rinse	12314 1	PW	TV= 415.1

RELEASED BY	DATE/TIME	RECEIVED BY	DATE/TIME
	9/11/20 1058		9/11/20 1056

ANALYSIS REQUIRED: HCl by EPA Method 26A report as mg/sample. Record total volume of each sample.

AA MONTP

Appendix A.4
Calibration Data

SPAN GAS RECORD

CLIENT/LOCATION: Desert View Power
Unit 2

DATE: 9/9/2020
BY: DW

	MID SPAN CYLINDER		HIGH SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO	CC88043	0.00		
O_2	DT0022871	10.48	DT0011386	19.15
CO_2	DT0022871	10.48	DT0011386	18.94

PRE-TEST INSTRUMENT CALIBRATION ERROR

	ANALYZER					
	O_2	CO_2				STATUS
Analyzer Range	20	20				
Zero Gas Value	0.0	0.0				--
Analyzer Reads	-0.01	0.02				--
Error (% of scale)	0.0%	0.1%				PASS
High Gas Value	19.15	18.94				--
Analyzer Reads	19.14	18.95				--
Error (% of scale)	-0.1%	0.0%				PASS
Mid Gas Value	10.48	10.48				--
Analyzer Reads	10.51	10.60				--
Error (% of scale)	0.1%	0.6%				PASS
Linearity at Mid Point	0.2%	0.5%				

POST-TEST INSTRUMENT CALIBRATION ERROR

	ANALYZER					
	O_2	CO_2				STATUS
Analyzer Range	20	20				
Zero Gas Value	0.0	0.0				--
Analyzer Reads	-0.03	0.02				--
Error (% of scale)	-0.1%	0.1%				PASS
High Gas Value	19.15	18.94				--
Analyzer Reads	18.78	18.88				--
Error (% of scale)	-1.9%	-0.3%				PASS
Mid Gas Value	10.48	10.48				--
Analyzer Reads	10.30	10.53				--
Error (% of scale)	-0.9%	0.2%				PASS
Linearity at Mid Point	0.2%	0.4%				

% ERROR CALCULATION:
(AS FOUND - ACTUAL VALUE OF SPAN)/RANGE * 100%
ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIPCHART)

SPAN GAS RECORD

CLIENT/LOCATION: Desert View Power
Unit 1

DATE: 9/10/2020
BY: DW

	MID SPAN CYLINDER		HIGH SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO	CC88043	0.00		
O_2	DT0022871	10.48	DT0011386	19.15
CO_2	DT0022871	10.48	DT0011386	18.94

PRE-TEST INSTRUMENT CALIBRATION ERROR

	ANALYZER					STATUS
	O_2	CO_2				
Analyzer Range	20	20				
Zero Gas Value	0.0	0.0				--
Analyzer Reads	0.00	0.02				--
Error (% of scale)	0.0%	0.1%				PASS
High Gas Value	19.15	18.94				--
Analyzer Reads	19.14	18.92				--
Error (% of scale)	-0.1%	-0.1%				PASS
Mid Gas Value	10.48	10.48				--
Analyzer Reads	10.51	10.57				--
Error (% of scale)	0.1%	0.4%				PASS
Linearity at Mid Point	0.2%	0.5%				

POST-TEST INSTRUMENT CALIBRATION ERROR

	ANALYZER					STATUS
	O_2	CO_2				
Analyzer Range	20	20				
Zero Gas Value	0.0	0.0				--
Analyzer Reads	-0.02	0.02				--
Error (% of scale)	-0.1%	0.1%				PASS
High Gas Value	19.15	18.94				--
Analyzer Reads	18.77	18.91				--
Error (% of scale)	-1.9%	-0.2%				PASS
Mid Gas Value	10.48	10.48				--
Analyzer Reads	10.32	10.55				--
Error (% of scale)	-0.8%	0.4%				PASS
Linearity at Mid Point	0.3%	0.4%				

% ERROR CALCULATION:
(AS FOUND - ACTUAL VALUE OF SPAN)/RANGE * 100%
ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIPCHART)

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Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles, CA 90058
Tel: 323-585-2154
Fax: 714-542-6689

Cu MONTROSE AIR QUALITY SERVICES
PF 1631 E. St Andrew Pl.
15 SA Santa Ana, CA 92705

Praxair Order Number: **71208649**
Customer PO Number: **79196724**

Certificate Issuance Date: **1/7/2020**
Certification Date: **1/7/2020**
Lot Number: **N70086000603**
Part Number: **NI 5.5CE-AS**
DocNumber: **164126**

N_2
CC680473 F.D. 1/6/20

CERTIFICATE OF ANALYSIS

Nitrogen, 5.5 Continuous Emission Monitoring Zero

Analytes	Specification	Analytical Results	Analytical Reference	Analytical Uncertainty
Nitrogen	**99.9995 %**	**99.9995 %**	**3**	------
Carbon Dioxide	**≤ 1 ppm**	**< 0.3 ppm**	**1**	**± 10%**
Carbon Monoxide	**≤ 0.5 ppm**	**< 0.3 ppm**	**1**	**± 15%**
Total Hydrocarbons	**≤ 0.1 ppm**	**< 0.1 ppm**	**4**	**± 15%**
Oxides of Nitrogen	**≤ 0.1 ppm**	**< 0.1 ppm**	**7**	**± 15%**
Oxygen	**≤ 0.5 ppm**	**< 0.5 ppm**	**5**	**± 15%**
Sulfur Dioxide	**≤ 0.1 ppm**	**< 0.1 ppm**	**6**	**± 15%**
Water	**≤ 2 ppm**	**< 0.5 ppm**	**2**	**± 10%**

Cylinder Style: **AS**
Cylinder Pressure @ 70 F: **2000 psig**
Cylinder Volume: **142 ft3**
Valve Outlet Connection: **CGA 580**
Fill Date: **1/6/2020**
Analysis Date: **1/7/2020**
Filling Method: **Pressure/Temperature**
Cylinder Number(s): **CC118983, SA6076, CC116805, DT0017367, CC88043, SA8454, DT0014185, CC416188, DT0022790, DT0008935, CC66712, CC170680**
Analyzed Cylinder Number(s): **CC118983**

Analyst: **Amalia Real**
Approved Signer: **Ying Yu**

Key to Analytical Techniques:

Reference	Analytical Instrument - Analytical Principle
1	Horiba Instruments Inc. GA-360E - NDIR
2	Meeco Aquavolt PLUS - Specific Water Analyzer
3	N/A - By Difference of Typical Impurities
4	Rosemount/Beckman 400A - FID Total Hydrocarbon Analyzer
5	Servomex DF310E SN# PT-25457-V6 - Electrolytic Cell/Electrochemical
6	Thermo 43I-AKSCA S/N 1420962322 - UV Spectrometry
7	Thermo Electron 42i-LS S/N 1030645077 - Chemiluminescence

This analysis of the product described herein was prepared by Praxair Distribution, Inc. using instruments whose calibration is certified using Praxair Distribution, Inc. Reference Materials which are traceable to the International System of Units (SI) through either weights traceable to the National Institute of Standards and Technology (NIST) or Measurement Canada, or through NIST Standard Reference Materials or equivalent where available.

Note: All expressions for concentration (e.g., % or ppm) are for gas phase, by volume (e.g., ppmv) unless otherwise noted. Analytical uncertainty is expressed as a Relative % unless otherwise noted.

CS 6/19/20

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DocNumber: 293840

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22019

MONITROSE AIR QUALITY SERVICES

1631 E. St Andrew Pl.
Santa Ana, CA 92705

F ANALYSIS / EPA PROTOCOL GAS

Certificate Issuance Date: 11/19/2019
Praxair Order Number: 71151966
Part Number: NI CD10.5O6E-AS
Customer PO Number: 79138652

Fill Date: 11/12/2019
Lot Number: 70086931604
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 140 ft3

O_2 10.48
CO_2 10.48

Certified Concentration

Expiration Date:	11/19/2027	NIST Traceable
Cylinder Number:	DT0022871	Expanded Uncertainty
10.48 %	Carbon dioxide	± 0.6 %
10.48	Oxygen	± 0.4 %
Balance	Nitrogen	

ProSpec EZ Cert

DT0022871
Exp 11/19/27

Certification Date: 11/19/2019 *Term:* 96 Months *Expiration Date:* 11/19/2027

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
Do Not Use this cylinder if Pressure is less than 150 PSIG.
CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference

F22019

Analytical Data (R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. ***Component:*** Carbon dioxide

Requested Concentration: 10.5 %
Certified Concentration: 10.48 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 10/21/2019

First Analysis Data:						Date	11/19/2019
Z:	0	R:	14	C:	10.48	Conc:	10.48
R:	14	Z:	0	C:	10.48	Conc:	10.48
Z:	0	C:	10.5	R:	14.02	Conc:	10.5
UOM:	%			Mean Test Assay:			10.48 %

Reference Standard: Type / Cylinder #: GMIS / CC164230
Concentration / Uncertainty: 14.00 % ±0.265%
Expiration Date: 04/16/2027
Traceable to: SRM # / Sample # / Cylinder #: SRM 1675b / G-F-51 / CAL014538
SRM Concentration / Uncertainty: 13.963% / ±0.034%
SRM Expiration Date: 05/16/2022

Second Analysis Data:						Date	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			%

2. ***Component:*** Oxygen

Requested Concentration: 10.5 %
Certified Concentration: 10.48 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 10/21/2019

First Analysis Data:						Date	11/19/2019
Z:	0	R:	9.88	C:	10.49	Conc:	10.48
R:	9.88	Z:	0	C:	10.49	Conc:	10.48
Z:	0	C:	10.5	R:	9.89	Conc:	10.49
UOM:	%			Mean Test Assay:			10.48 %

Reference Standard: Type / Cylinder #: NTRM / DT0010384
Concentration / Uncertainty: 9.875 % ±0.4%
Expiration Date: 11/18/2022
Traceable to: SRM # / Sample # / Cylinder #: NTRM / 170701 / NTRM DT0010384
SRM Concentration / Uncertainty: 9.875% / ±0.040%
SRM Expiration Date: 11/18/2022

Second Analysis Data:						Date	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			%

Analyzed By: Jose Vasquez

Certified By: Jenna Lockman

CR
12/16/19

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DocNumber: 293572

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22019

MONTROSE AIR QUALITY SERVICES

OF ANALYSIS / EPA PROTOCOL GAS

1631 E. St Andrew Pl.
Santa Ana, CA 92705

Certificate Issuance Date: 11/14/2019
Praxair Order Number: 90362737
Part Number: NI CD19O2E-AS
Customer PO Number: VERBAL MIKE

Fill Date: 11/11/2019
Lot Number: 70086931505
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 156 ft3

O2 19.15
CO2 18.94
DT0011386
Exp 11/15/27
F22019

Certified Concentration

Expiration Date:	11/15/2027	NIST Traceable
Cylinder Number:	DT0011386	Expanded Uncertainty
18.94 %	Carbon dioxide	± 0.5 %
19.15 %	Oxygen	± 0.1 %
Balance	Nitrogen	

ProSpec EZ Cert

Certification Information: *Certification Date:* 11/15/2019 *Term:* 96 Months *Expiration Date:* 11/15/2027

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.

Do Not Use This Cylinder if Pressure is Less Than 100 PSIG

CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

Analytical Data: (R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. *Component:* Carbon Dioxide

Requested Concentration: 19 %
Certified Concentration: 18.94 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 10/21/2019

First Analysis Data:					Date 11/15/2019
Z: 0	R: 19.98	C: 18.94	Conc: 18.94		
R: 19.98	Z: 0	C: 18.94	Conc: 18.94		
Z: 0	C: 18.96	R: 19.99	Conc: 18.96		
UOM: %		Mean Test Assay:	18.94 %		

Reference Standard: Type / Cylinder #: GMIS / CC149981
Concentration / Uncertainty: 19.98 % ±0.279%
Expiration Date: 06/07/2026
Traceable to: SRM # / Sample # / Cylinder #: RGM#CC28033 / N/A / RGM#CC28033
SRM Concentration / Uncertainty: 19.67% / ±0.04%
SRM Expiration Date: 07/15/2021

Second Analysis Data:					Date
Z: 0	R: 0	C: 0	Conc: 0		
R: 0	Z: 0	C: 0	Conc: 0		
Z: 0	C: 0	R: 0	Conc: 0		
UOM: %		Mean Test Assay:	%		

2. *Component:* Oxygen

Requested Concentration: 19 %
Certified Concentration: 19.15 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 10/21/2019

First Analysis Data:					Date 11/15/2019
Z: 0	R: 20.88	C: 19.15	Conc: 19.13		
R: 20.88	Z: 0	C: 19.17	Conc: 19.15		
Z: 0	C: 19.17	R: 20.9	Conc: 19.15		
UOM: %		Mean Test Assay:	19.15 %		

Reference Standard: Type / Cylinder #: GMIS / CC506521
Concentration / Uncertainty: 20.87 % ±0.108%
Expiration Date: 12/14/2026
Traceable to: SRM # / Sample # / Cylinder #: SRM 2659a / 71-E-19 / FF22331
SRM Concentration / Uncertainty: 20.863% / ±0.021%
SRM Expiration Date: 08/23/2021

Second Analysis Data:					Date
Z: 0	R: 0	C: 0	Conc: 0		
R: 0	Z: 0	C: 0	Conc: 0		
Z: 0	C: 0	R: 0	Conc: 0		
UOM: %		Mean Test Assay:	%		

Analyzed By: Jose Vasquez

Certified By: Jenna Lockman

CR
12/16/19

SEMI-ANNUAL DRY GAS METER/ORIFICE CALIBRATION

Orifice Method - Triplicate Runs/Four Calibration Points
English Meter Box Units, English K' Factor
Filename: C:\Users\dwonderly\Information\Calibrations\Dry Gas Meters\17-wcs\2020\[Semi-Annual Meter Cal 4-3-20 WCS-17.xls]WCS
File Modified From: APEX 522 Series Meter box Calibration
Revised: 4/8/2005

Model #: C5000
ID #: 17WCS
Date: 4/3/2020
Bar. Pressure: 29.93 (in. Hg)
Performed By: R. Howard

	DRY GAS METER READINGS								CRITICAL ORIFICE READINGS					
		Volume	Volume	Volume	Initial Temps.		Final Temps.		Orifice	K' Orifice	Actual	Ambient Temperature		
dH (in H2O)	Time (min)	Initial (cu ft)	Final (cu ft)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.11	26.00	927.500	932.824	5.324	64.0	61.0	64.0	62.0	33	0.1551	19.0	56.0	56.0	56.0
0.11	26.00	932.824	938.147	5.323	64.0	62.0	65.0	62.0	33	0.1551	19.0	56.0	56.0	56.0
0.11	26.00	938.147	943.473	5.326	65.0	62.0	65.0	63.0	33	0.1551	19.0	56.0	56.0	56.0
0.45	12.00	872.000	877.291	5.291	58.0	57.0	59.0	57.0	48	0.3345	16.0	55.0	55.0	55.0
0.45	12.00	877.291	882.583	5.292	59.0	57.0	60.0	57.0	48	0.3345	16.0	55.0	55.0	55.0
0.45	12.00	882.583	887.871	5.288	60.0	57.0	59.0	57.0	48	0.3345	16.0	55.0	55.0	55.0
1.50	7.00	890.500	895.963	5.463	60.0	58.0	62.0	60.0	63	0.5915	14.0	56.0	56.0	56.0
1.50	7.00	895.963	901.424	5.461	62.0	60.0	62.0	61.0	63	0.5915	14.0	56.0	56.0	56.0
1.50	7.00	901.424	906.887	5.463	62.0	61.0	62.0	60.0	63	0.5915	14.0	56.0	56.0	56.0
2.80	5.00	910.600	915.669	5.069	64.0	60.0	65.0	61.0	73	0.7678	12.0	55.0	55.0	55.0
2.80	5.00	915.669	920.735	5.066	65.0	61.0	65.0	62.0	73	0.7678	12.0	55.0	55.0	55.0
2.80	5.00	920.735	925.807	5.072	65.0	62.0	65.0	62.0	73	0.7678	12.0	55.0	55.0	55.0

DRY GAS METER		ORIFICE			DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR	Individual Run	Individual Orifice	Orifice Average	Orifice Average
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Y Value (number)	dH@ Value (in H2O)	0.95 < Y < 1.05?	Ymax - Ymin < 0.010?	0.98 < Y/Yd < 1.02?	dH@ - dH@ av < 0.155?
5.379	152.3	5.313	150.5	5.193	0.988	1.500	**Pass**			
5.372	152.1	5.313	150.5	5.193	0.989	1.499	**Pass**			
5.370	152.1	5.313	150.5	5.193	0.989	1.498	**Pass**			
				Average	**0.989**	**1.499**		**Pass**	**Pass**	**Pass**
5.401	153.0	5.293	149.9	5.163	0.980	1.329	**Pass**			
5.397	152.8	5.293	149.9	5.163	0.981	1.329	**Pass**			
5.393	152.7	5.293	149.9	5.163	0.982	1.329	**Pass**			
				Average	**0.981**	**1.329**		**Pass**	**Pass**	**Pass**
5.567	157.7	5.456	154.5	5.332	0.980	1.413	**Pass**			
5.552	157.2	5.456	154.5	5.332	0.983	1.409	**Pass**			
5.554	157.3	5.456	154.5	5.332	0.982	1.409	**Pass**			
				Average	**0.982**	**1.411**		**Pass**	**Pass**	**Pass**
5.157	146.1	5.063	143.4	4.939	0.982	1.558	**Pass**			
5.147	145.8	5.063	143.4	4.939	0.984	1.555	**Pass**			
5.150	145.9	5.063	143.4	4.939	0.983	1.554	**Pass**			
				Average	**0.983**	**1.556**		**Pass**	**Pass**	**Pass**

Average Yd: 0.984 **dH@: 1.449**

Q @ dH = 1: 0.623

SIGNED: Signature on file Date: 4/3/2020

SEMI-ANNUAL DRY GAS METER/ORIFICE CALIBRATION

Orifice Method - Triplicate Runs/Four Calibration Points
English Meter Box Units, English K' Factor
Filename: C:\Users\dwonderly\Information\Calibrations\Dry Gas Meters\17-wcs\2020\[17WCS Semi Annual Cal 9-11-2020.xls]WCS
File Modified From: APEX 522 Series Meter box Calibration
Revised: 4/8/2005

Model #: C5000
ID #: 17WCS
Date: 9/11/2020
Bar. Pressure: 29.95 (in. Hg)
Performed By: L.Olivares

DRY GAS METER READINGS									CRITICAL ORIFICE READINGS					
		Volume	Volume	Volume	Initial Temps.		Final Temps.		Orifice	K' Orifice	Actual	Ambient Temperature		
dH (in H2O)	Time (min)	Initial (cu ft)	Final (cu ft)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.10	26.00	525.800	531.183	5.383	83.0	78.0	80.0	78.0	33	0.1552	22.5	65.0	65.0	65.0
0.10	26.00	531.183	536.563	5.380	80.0	78.0	80.0	78.0	33	0.1552	22.5	65.0	65.0	65.0
0.10	26.00	536.563	541.942	5.379	80.0	78.0	81.0	78.0	33	0.1552	22.5	65.0	65.0	65.0
0.50	12.00	509.300	514.640	5.340	83.0	77.0	81.0	77.0	48	0.3346	16.0	65.0	65.0	65.0
0.50	12.00	514.640	519.989	5.349	81.0	77.0	81.0	77.0	48	0.3346	16.0	65.0	65.0	65.0
0.50	12.00	519.989	525.334	5.345	82.0	77.0	83.0	78.0	48	0.3346	16.0	65.0	65.0	65.0
1.60	7.00	491.600	497.086	5.486	82.0	74.0	82.0	76.0	63	0.5918	14.0	65.0	65.0	65.0
1.60	7.00	497.086	502.572	5.486	82.0	76.0	82.0	76.0	63	0.5918	14.0	65.0	65.0	65.0
1.60	7.00	502.572	508.063	5.491	82.0	76.0	83.0	76.0	63	0.5918	14.0	65.0	65.0	65.0
2.80	5.00	475.400	480.549	5.149	77.0	72.0	78.0	72.0	73	0.7681	12.0	65.0	65.0	65.0
2.80	5.00	480.549	485.702	5.153	78.0	72.0	80.0	73.0	73	0.7681	12.0	65.0	65.0	65.0
2.80	5.00	485.702	490.824	5.122	80.0	73.0	82.0	74.0	73	0.7681	12.0	65.0	65.0	65.0

DRY GAS METER		ORIFICE			DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR	Individual Run	Individual Orifice	Orifice Average	Orifice Average
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Y Value (number)	dH@ Value (in H2O)	0.95 < Y < 1.05?	Ymax - Ymin < 0.010?	0.98 < Y/Yd < 1.02?	dH@ - dH@ av < 0.155?
5.270	149.3	5.273	149.3	5.240	1.001	1.343	**Pass**			
5.275	149.4	5.273	149.3	5.240	1.000	1.343	**Pass**			
5.271	149.3	5.273	149.3	5.240	1.000	1.343	**Pass**			
				Average	**1.000**	**1.343**		**Pass**	**Pass**	**Pass**
5.236	148.3	5.248	148.6	5.215	1.002	1.447	**Pass**			
5.249	148.7	5.248	148.6	5.215	1.000	1.447	**Pass**			
5.236	148.3	5.248	148.6	5.215	1.002	1.446	**Pass**			
				Average	**1.001**	**1.447**		**Pass**	**Pass**	**Pass**
5.403	153.0	5.414	153.3	5.380	1.002	1.486	**Pass**			
5.398	152.9	5.414	153.3	5.380	1.003	1.483	**Pass**			
5.401	153.0	5.414	153.3	5.380	1.003	1.483	**Pass**			
				Average	**1.003**	**1.484**		**Pass**	**Pass**	**Pass**
5.122	145.1	5.020	142.2	4.989	0.980	1.552	**Pass**			
5.116	144.9	5.020	142.2	4.989	0.981	1.551	**Pass**			
5.071	143.6	5.020	142.2	4.989	0.990	1.548	**Pass**			
				Average	**0.984**	**1.550**		**Pass**	**Pass**	**Pass**

Average Yd: 0.997 **dH@: 1.456**

Q @ dH = 1: 0.622

SIGNED: Signature on file Date: 9/11/2020

SEMI-ANNUAL DRY GAS METER/ORIFICE CALIBRATION

Orifice Method - Triplicate Runs/Four Calibration Points
English Meter Box Units, English K' Factor
Filename: C:\Users\dwonderly\Information\Calibrations\Dry Gas Meters\29-wcs\2020\[semi annual cal 29wcs 8-6-20.xlsx]WCS
File Modified From: APEX 522 Series Meter box Calibration
Revised: 4/8/2005

c-5000
ID #: 29-wcs
Date: 8/6/2020
Bar. Pressure: 29.91 (in. Hg)
Performed By: R. Howard
Meter Serial #:

DRY GAS METER READINGS									CRITICAL ORIFICE READINGS					
					Initial Temps.		Final Temps.					Ambient Temperature		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.14	26.00	267.600	272.917	5.317	78.0	77.0	79.0	79.0	33	0.1551	18.0	76.0	76.0	76.0
0.14	26.00	272.917	278.233	5.316	79.0	79.0	80.0	79.0	33	0.1551	18.0	76.0	76.0	76.0
0.14	26.00	278.233	283.550	5.317	80.0	79.0	80.0	80.0	33	0.1551	18.0	76.0	76.0	76.0
0.64	12.00	302.400	307.667	5.267	85.0	82.0	86.0	84.0	48	0.3345	17.5	76.0	76.0	76.0
0.64	12.00	307.667	312.929	5.262	86.0	84.0	86.0	83.0	48	0.3345	17.5	76.0	76.0	76.0
0.64	12.00	312.929	318.189	5.260	86.0	83.0	86.0	83.0	48	0.3345	17.5	76.0	76.0	76.0
1.90	7.00	285.000	290.473	5.473	82.0	80.0	85.0	80.0	63	0.5915	14.0	76.0	76.0	76.0
1.90	7.00	290.473	295.944	5.471	85.0	80.0	88.0	81.0	63	0.5915	14.0	76.0	76.0	76.0
1.90	7.00	295.944	301.421	5.477	88.0	81.0	89.0	82.0	63	0.5915	14.0	76.0	76.0	76.0
3.20	5.00	320.000	324.997	4.997	87.0	84.0	87.0	85.0	73	0.7678	10.0	76.0	76.0	76.0
3.20	5.00	324.997	329.992	4.995	87.0	85.0	86.0	85.0	73	0.7678	10.0	76.0	76.0	76.0
3.20	5.00	329.992	334.991	4.999	86.0	85.0	86.0	85.0	73	0.7678	10.0	76.0	76.0	76.0

RY GAS METER		ORIFICE			DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR	Individual Run	Individual Orifice	Orifice Average	Orifice Average
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Y Value (number)	dH@ Value (in H2O)	0.95 < Y < 1.05?	Ymax - Ymin < 0.010?	0.98 < Y/Yd < 1.02?	dH@ - dH@ av < 0.155?
5.214	147.7	5.210	147.5	5.293	0.999	1.924	**Pass**			
5.203	147.4	5.210	147.5	5.293	1.001	1.921	**Pass**			
5.199	147.2	5.210	147.5	5.293	1.002	1.919	**Pass**			
				Average	**1.001**	**1.921**		**Pass**	**Pass**	**Pass**
5.114	144.8	5.185	146.8	5.268	1.014	1.874	**Pass**			
5.104	144.6	5.185	146.8	5.268	1.016	1.872	**Pass**			
5.105	144.6	5.185	146.8	5.268	1.016	1.874	**Pass**			
				Average	**1.015**	**1.874**		**Pass**	**Pass**	**Pass**
5.355	151.7	5.350	151.5	5.435	0.999	1.789	**Pass**			
5.336	151.1	5.350	151.5	5.435	1.003	1.787	**Pass**			
5.327	150.9	5.350	151.5	5.435	1.004	1.784	**Pass**			
				Average	**1.002**	**1.786**		**Pass**	**Pass**	**Pass**
4.869	137.9	4.960	140.5	5.039	1.019	1.773	**Pass**			
4.867	137.8	4.960	140.5	5.039	1.019	1.772	**Pass**			
4.873	138.0	4.960	140.5	5.039	1.018	1.772	**Pass**			
				Average	**1.019**	**1.772**		**Pass**	**Pass**	**Pass**

Average Yd: 1.009 **dH@: 1.838**

Q @ dH = 1: 0.553

SIGNED: Signature on File Date: 8/6/2020

MONTROSE
AIR QUALITY SERVICES

THERMOCOUPLE CALIBRATION

Thermocouple ID: 75
Date: 7/2/2020
Performed By: JG/DH/LO/DA

Calibrated Digital Temperature Readout ID: PTC-79
T1 Reference Thermometer ID: 492956
T2 Reference Thermometer ID: 242196
T3 Reference Thermometer ID: 242167

T/C I.D.	Readout	T/C - Readout °F				Reference Thermometer °F				Difference		
75	I.D.	Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	°F	%, (°R)	
T3 (OIL)	PTC-79	360	360	360	360	364	364	364	364	4.0	0.5%	Pass
T2 (Boiling H_2O)	PTC-79	217	217	217	217	214	214	214	214	3.0	0.4%	Pass
T1 (Ice/Water)	PTC-79	32	33	33	33	32	32	32	32	0.7	0.1%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

MONTROSE
AIR QUALITY SERVICES

DIGITAL TEMPERATURE READOUT CALIBRATION

Digital Temperature Readout ID: 29-WCS
Readout Description: Control Box
Date: 7/2/2020
Performed By: JG/DH/LO/DA

Calibrated Thermocouple ID: TC-CAL
T1 Reference Thermometer ID: 492956
T2 Reference Thermometer ID: 242196
T3 Reference Thermometer ID: 242167

T/C I.D.	Readout	T/C - Readout °F				Reference Thermometer °F				Difference		
TC-CAL	I.D.	Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	°F	%, (°R)	
T3 (OIL)	29-WCS	347	347	347	347	350	350	350	350	3.0	0.4%	Pass
T2 (Boiling H_2O)	29-WCS	214	214	214	214	212	212	212	212	2.0	0.3%	Pass
T1 (Ice/Water)	29-WCS	33	33	33	33	32	32	32	32	1.0	0.2%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

Thermocouple Source Readings

	T/C Source	T/C - Readout °F				T/C Source °F				Difference		
	S/N	Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	°F	%, (°R)	
T4 (~650 F)	S/N 106970	653	653	653	653	650	650	650	650	3.0	0.3%	Pass
T3 (~370 F)	S/N 106970	366	366	366	366	365	365	365	365	1.0	0.1%	Pass
T2 (~212 F)	S/N 106970	213	212	212	212	212	212	212	212	0.3	0.0%	Pass
T1 (~32 F)	S/N 106970	33	33	33	33	32	32	32	32	1.0	0.2%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

MONTROSE
AIR QUALITY SERVICES

DIGITAL TEMPERATURE READOUT CALIBRATION

Digital Temperature Readout ID: 17-WCS
Readout Description: Control Box
Date: 7/2/2020
Performed By: JG/DH/LO/DA

Calibrated Thermocouple ID: TC-CAL
T1 Reference Thermometer ID: 492956
T2 Reference Thermometer ID: 242196
T3 Reference Thermometer ID: 242167

T/C I.D.	Readout	T/C - Readout °F				Reference Thermometer °F				Difference		
TC-CAL	I.D.	Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	°F	%, (°R)	
T3 (OIL)	17-WCS	355	356	356	356	368	368	368	368	12.3	1.5%	Pass
T2 (Boiling H_2O)	17-WCS	208	208	208	208	212	212	212	212	4.0	0.6%	Pass
T1 (Ice/Water)	17-WCS	27	27	27	27	32	32	32	32	5.0	1.0%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

Thermocouple Source Readings

	T/C Source	T/C - Readout °F				T/C Source °F				Difference		
	S/N	Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	°F	%, (°R)	
T4 (~650 F)	S/N 106970	649	649	648	649	650	650	650	650	1.3	0.1%	Pass
T3 (~370 F)	S/N 106970	360	360	360	360	365	365	365	365	5.0	0.6%	Pass
T2 (~212 F)	S/N 106970	209	209	209	209	212	212	212	212	3.0	0.4%	Pass
T1 (~32 F)	S/N 106970	27	27	27	27	32	32	32	32	5.0	1.0%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

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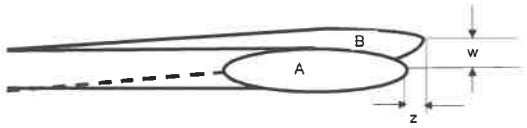
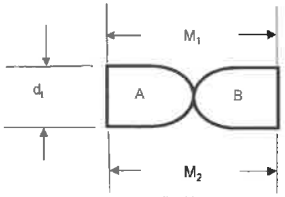
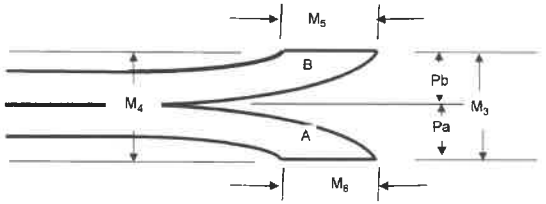
S Type Pitot Tube Dimensional Calibration Record



Side View



End View



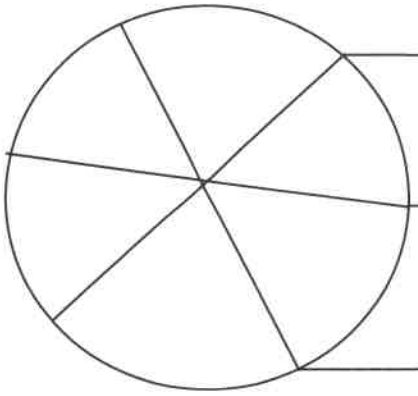
Top View

Acceptability Criteria			z < 1/8"	w < 1/32"	Yes	"3/16" < Dt < 3/8"	n/a	n/a	n/a	n/a	n/a	n/a	10 degrees	5 degrees	1.05 Dt < P < 1.5 Dt	
Pitot ID	Date	Calibrated By	Side View, Impact openings Properly aligned, z < 1/8"	Side View, Impact openings Properly aligned, w < 1/32"	Pa = Pb	Tubing Diameter, dt	M1	M2	M3	M4	M5	M6	Average Face Opening Plane Angle, offset from perpendicular to transverse axis	Average Face Opening Plane Frontal Angle from parallel to Longitudinal Axis	Ratio of P/Dt	Status
075	7/2/20	DA	Y	Y	Y	0.375	0.934	0.930	0.921	0.957	0.408	0.428	0.3	-2.5	1.2	Pass

Notes: Reference "A Type-S Pitot Tube Calibration Study", Robert F. Vollaro, October 15, 1975
If tube is not visibly deformed it is assumed that Pa = Pb = .5 x avg. of M1 & M2, and that average face opening plane angles represent individual angles to tube axis

NOZZLE CALIBRATION DATA

Nozzle I.D. DUPH 1	Date 9/8/2020
Material GLASS	By
Configuration (L or Hook)	



D_1 = 0.221

D_2 = 0.220

D_3 = 0.221

Maximum Difference D_i - D_j = .001 (must be 0.004" or less)

Average Dn = 0.221

Note: Measure three diameters with micrometer

APPENDIX B
CALCULATIONS

Appendix B.1
General Emissions Calculations

GENERAL EMISSION CALCULATIONS

I. Stack Gas Velocity

A. Stack gas molecular weight, lb/lb-mole

$$MW_{dry} = 0.44 * \%CO_2 + 0.32 * \%O_2 + 0.28 * \%N_2$$

$$MW_{wet} = MW_{dry} * (1 - B_{wo}) + 18 * B_{wo}$$

B. Absolute stack pressure, iwg

$$Ps = Pbar + \frac{Psg}{13.6}$$

C. Stack gas velocity, ft/sec

$$V_s = 2.9 * C_p * \sqrt{\Delta P} * \sqrt{T_s} * \sqrt{\frac{29.92 * 28.95}{P_s * MW_{wet}}}$$

II. Moisture

A. Sample gas volume, dscf

$$V_{mstd} = 0.03342 * V_m * (P_{bar} + \frac{\Delta H}{13.6}) * \frac{T_{ref}}{T_m} * Y_d$$

B. Water vapor volume, scf

$$V_{wstd} = 0.0472 * V_{lc} * \frac{T_{ref}}{528\ ^oR}$$

C. Moisture content, dimensionless

$$B_{wo} = \frac{V_{wstd}}{(V_{mstd} + V_{wstd})}$$

III. Stack gas volumetric flow rate

A. Actual stack gas volumetric flow rate, wacfm

$$Q = V_s * A_s * 60$$

B. Standard stack gas flow rate, dscfm

$$Q_{sd} = Q * (1 - B_{wo}) * \frac{T_{ref}}{T_s} * \frac{P_s}{29.92}$$

IV. Gaseous Mass Emission Rates, lb/hr

$$M = \frac{ppm * MW_i * Q_{sd} * 60}{SV * 10^6}$$

V. Emission Rates, lb/MMBtu

$$\frac{lb}{MMBtu} = \frac{ppm * MW_i * F}{SV * 10^6} * \frac{20.9}{20.9 - \%O_2}$$

VI. Percent Isokinetic

$$I = \frac{17.32 \times T_s\ (V_m std)}{(1\text{-}Bwo)\ 0 \times Vs \times Ps \times Dn2} \times \frac{520°R}{T_{ref}}$$

VII. Particulate emissions

(a) Grain loading, gr/dscf
$C = 0.01543\ (M_n/V_{m\ std})$

(b) Grain loading at 12% CO_2, gr/dscf
$C_{12\%}\ CO_2 = C\ (12/\%\ CO_2)$

(c) Mass emissions, lb/hr
$M = C \times Qsd \times (60\ min/hr)/(7000\ gr/lb)$

(d) Particulate emission factor

$$lb/10^6\ Btu = Cx \frac{1\ lb}{7000\ gr} \times F \times \frac{20.9}{20.9 - \%\ O_2}$$

Nomenclature:

A_s	= stack area, ft^2
B_{wo}	= flue gas moisture content, dimensionless
$C_{12\%CO2}$	= particulate grain loading, gr/dscf corrected to 12% CO_2
C	= particulate grain loading, gr/dscf
C_p	= pitot calibration factor, dimensionless
Dn	= nozzle diameter, in.
F	= fuel F-Factor, dscf/MMBtu @ 0% O_2
H	= orifice differential pressure, iwg
I	= % isokinetics
M_n	= mass of collected particulate, mg
M_i	= mass emission rate of specie i, lb/hr
MW	= molecular weight of flue gas, lb/lb-mole
M_{wi}	= molecular weight of specie i: SO_2: 64 NO_x: 46 CO: 28 HC: 16
0	= sample time, min.
ΔP	= average velocity head, iwg = $(\sqrt{\Delta P})^2$
P_{bar}	= barometric pressure, inches Hg
P_s	= stack absolute pressure, inches Hg
P_{sg}	= stack static pressure, iwb
Q	= wet stack flow rate at actual conditions, wacfm
Q_{sd}	= dry standard stack flow rate, dscfm
SV	= specific molar volume of an ideal gas at standard conditions, ft^3/lb-mole
T_m	= meter temperature, °R
T_{ref}	= reference temperature, °R
T_s	= stack temperature, °R
V_s	= stack gas velocity, ft/sec
V_{lc}	= volume of liquid collected in impingers, ml
V_m	= uncorrected dry meter volume, dcf
V_{mstd}	= dry meter volume at standard conditions, dscf
V_{wstd}	= volume of water vapor at standard conditions, scf
Y_d	= meter calibration coefficient

Appendix B.2
Unit 1 Calculations

Appendix B.2.1
Unit 1 Gaseous Calculations

MOBILE EMISSION LABORATORY
CONTINUOUS GASEOUS MEASUREMENTS SUMMARY

Client:	Desert View Power		Condition:	----	
Unit:	1		Load:	> 90%	
Location:	Mecca		Date	9/10/2020	

	O2%	CO2%				
Analyzer Range:	20	20				
Span Value:	10.48	10.48				
	O2%	CO2%				
As Found	10.51	10.57				
Linearity	0.1%	0.4%			<2%	**Pass**
9/10/2020	O2%	CO2%				
1 -HCL-U1						
Analyzer Range:	20	20				
Span Value:	10.48	10.48				
Pre test Direct Zero	0.00	0.02				
Pre test Direct Span	10.51	10.57				
System Zero	0.03	0.06				
System Span	10.48	10.56				
Average	8.41	12.08				
System Zero	0.05	0.05				
System Span	10.46	10.48				
Post test Direct Zero	0.00	0.02				
Post test Direct Span	10.51	10.56				
Corrected Conc.	8.41	12.05				
System Bias Check						
Zero Pre-test	0.14%	0.31%			< 5%	**PASS**
Zero Post-test	0.23%	0.25%			< 5%	**PASS**
Span Pre-test	0.00%	0.37%			< 5%	**PASS**
Span Post-test	-0.08%	-0.01%			<5%	**PASS**

9/10/2020	O2%	CO2%				
2-CEM-U1						
Analyzer Range:	20	20				
Span Value:	10.48	10.48				
Pre test Direct Zero	0.00	0.02				
Pre test Direct Span	10.51	10.56				
System Zero	0.05	0.05				
System Span	10.46	10.48				
Raw concentration	8.37	12.09				
System Zero	0.04	0.06				
System Span	10.41	10.53				
Post test Direct Zero	-0.01	0.02				
Post test Direct Span	10.44	10.60				
Corrected Conc.	8.40	12.07				
System Bias Check						
Zero Pre-test	0.23%	0.25%			< 5%	**PASS**
Zero Post-test	0.21%	0.30%			< 5%	**PASS**
Span Pre-test	-0.08%	-0.01%			< 5%	**PASS**
Span Post-test	-0.38%	0.24%			<5%	**PASS**

9/10/2020	O2%	CO2%	NOx ppm	CO ppm		
3-CEM-U1						
Analyzer Range:	20	20	0	0		
Span Value:	10.48	10.48	0.00	0.00		
Pre test Direct Zero	-0.01	0.02	0.00	0.00		
Pre test Direct Span	10.44	10.60	0.00	0.00		
System Zero	0.03	0.05	0.00	0.00		
System Span	10.31	10.50	0.00	0.00		
Raw concentration	8.16	12.12				
System Zero	0.03	0.06				
System Span	10.17	10.50				
Post test Direct Zero	-0.02	0.02				
Post test Direct Span	10.32	10.55				
Corrected Conc.	8.34	12.10				
System Bias Check						
Zero Pre-test	0.16%	0.26%			< 5%	**PASS**
Zero Post-test	0.13%	0.30%			< 5%	**PASS**
Span Pre-test	-0.86%	0.11%			< 5%	**PASS**
Span Post-test	-1.55%	0.12%			<5%	**PASS**

Appendix B.2.2
Unit 1 Hydrogen Chloride Calculations

EPA METHOD 26A SOURCE TEST

DATA AND WORKSHEET

Client	Desert View Power	Parameter		Full Load
Loaction	Mecca	Fuel		Biomass
Unit	1	Data By		DW
Test Number	1-HCL-U1	2-HCL-U1	3-HCL-U1	Average
Reference Temperature, F	68	68	68	
Test Date	9/10/2020	9/10/2020	9/10/2020	
Sample Train	29-WCS	29-WCS	29-WCS	-
Pitot Factor	0.840	0.840	0.840	-
Meter Calibration Factor	1.009	1.009	1.009	-
Stack Area (sq ft)	38.84	38.84	38.84	-
Sample Time (Min)	120	120	120	120
Barometric Pressure (in Hg)	30.10	30.10	30.10	30.10
Nozzle Diam (in)	0.221	0.221	0.221	0.221
Start/Stop Time	553/758	822/1027	1230/1435	-
Stack Pressure (iwg)	0.32	0.32	0.32	0.32
Delta P (iwg)	1.031	1.036	1.023	1.030
Meter Pressure (iwg)	1.36	1.38	1.39	1.38
Stack Temperature (F)	400.1	408.5	410.1	406.2
Meter Temperature (F)	82.9	101.5	108.3	97.6
Meter Volume (acf)	75.896	78.404	78.783	77.694
Liquid Volume (ml)	232.5	249.5	243.3	241.8
Stack O2 (%)	8.41	8.40	8.34	8.38
Stack CO2 (%)	12.05	12.07	12.10	12.08
Standard Sample Volume (SCF)	75.160	75.081	74.543	74.928
Moisture Fraction	0.127	0.136	0.133	0.132
Molecular Weight (wet)	28.70	28.60	28.63	28.65
Stack Gas Velocity (ft/sec)	72.61	73.27	72.83	72.90
Stack Flow Rate (wacfm)	169,215	170,739	169,731	169,895
Stack Flow Rate (dscfm)	91,227	90,308	89,830	90,455
Isokinetic Ratio (%)	100.07	100.98	100.79	100.61
mg/sample	39.4	39.4	35.3	38.0
mg/dscm	18.51	18.53	16.72	17.92
ppm (as HCl)	12.20	12.21	11.02	11.81
lb/hr (as HCl)	6.32	6.26	5.62	6.07
MMBtu/Hr	383	383	383	383
Lb/MMBtu	0.017	0.016	0.015	0.016

1-HCL-U1							2-HCL-U1							3-HCL-U1						
	dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm	
5	1.30	1.140	1.6	400	74	75	5	1.20	1.095	1.6	400	90	93	5	1.10	1.049	1.4	408	100	103
4	1.00	1.000	1.3	399	72	74	4	1.10	1.049	1.5	401	90	93	4	1.20	1.095	1.6	409	101	104
3	0.98	0.990	1.2	400	73	75	3	1.10	1.049	1.5	403	91	94	3	1.00	1.000	1.3	409	100	104
2	1.00	1.000	1.3	400	72	75	2	1.00	1.000	1.4	404	93	96	2	1.00	1.000	1.3	409	100	105
1	1.00	1.000	1.3	400	72	76	1	0.98	0.990	1.3	402	94	98	1	0.97	0.985	1.3	410	101	106
5	1.20	1.095	1.5	400	73	77	5	1.10	1.049	1.5	403	96	99	5	1.00	1.000	1.3	410	102	107
4	1.30	1.140	1.6	400	73	78	4	1.20	1.095	1.6	404	97	99	4	1.20	1.095	1.6	410	103	107
3	1.10	1.049	1.4	400	74	78	3	1.10	1.049	1.5	406	97	100	3	1.20	1.095	1.6	411	105	111
2	1.00	1.000	1.3	400	75	79	2	1.00	1.000	1.4	408	98	101	2	1.00	1.000	1.4	410	105	112
1	0.98	0.990	1.3	399	76	80	1	0.95	0.975	1.3	408	98	102	1	0.95	0.975	1.3	410	106	113
5	0.98	0.990	1.3	400	77	81	5	1.20	1.095	1.6	408	98	103	5	1.10	1.049	1.5	410	107	112
4	0.87	0.933	1.1	399	78	82	4	1.10	1.049	1.5	409	98	103	4	1.00	1.000	1.4	410	107	112
3	0.83	0.911	1.1	399	78	84	3	1.10	1.049	1.4	409	98	104	3	0.93	0.964	1.3	410	108	112
2	0.87	0.933	1.1	399	79	85	2	0.94	0.970	1.2	409	99	104	2	0.84	0.917	1.1	411	108	112
1	0.85	0.922	1.1	399	80	86	1	0.90	0.949	1.2	410	99	103	1	0.80	0.894	1.1	410	107	112
5	1.10	1.049	1.5	400	83	87	5	0.98	0.990	1.3	409	100	104	5	1.00	1.000	1.4	411	107	112
4	1.20	1.095	1.6	400	84	88	4	0.92	0.959	1.2	411	100	104	4	1.10	1.049	1.5	410	107	111
3	1.00	1.000	1.4	400	85	89	3	0.86	0.927	1.1	410	101	104	3	1.00	1.000	1.4	410	108	111
2	0.95	0.975	1.3	400	86	90	2	0.83	0.911	1.1	410	103	106	2	0.98	0.990	1.3	411	107	112
1	0.92	0.959	1.2	401	85	90	1	0.81	0.900	1.1	411	103	107	1	0.94	0.970	1.3	411	108	112
5	1.10	1.049	1.5	402	86	90	5	1.10	1.049	1.4	410	104	108	5	1.20	1.095	1.6	410	107	113
4	1.00	1.000	1.4	403	86	91	4	1.20	1.095	1.6	411	104	108	4	1.10	1.049	1.5	410	107	114
3	1.10	1.049	1.5	402	86	91	3	1.10	1.049	1.4	412	104	108	3	1.00	1.000	1.4	410	107	113
2	1.20	1.095	1.6	401	87	91	2	0.98	0.990	1.3	412	104	108	2	1.00	1.000	1.4	410	107	113
1	0.98	0.990	1.3	400	87	92	1	0.95	0.975	1.2	412	103	108	1	0.93	0.964	1.3	410	107	113
5	1.00	1.000	1.4	400	88	92	5	1.20	1.095	1.6	412	104	109	5	1.20	1.095	1.6	411	108	114
4	1.20	1.095	1.6	400	88	92	4	1.20	1.095	1.6	413	105	110	4	1.00	1.000	1.4	411	108	114
3	1.10	1.049	1.5	400	89	94	3	1.10	1.049	1.4	412	105	108	3	1.10	1.049	1.5	410	108	114
2	0.97	0.985	1.3	401	89	94	2	1.00	1.000	1.3	413	104	109	2	1.00	1.000	1.4	410	108	114
1	0.95	0.975	1.3	400	90	94	1	0.97	0.985	1.3	413	105	110	1	0.92	0.959	1.2	410	107	113
Average		1.0308	1.363	400.1	82.9		Average		1.0358	1.380	408.5	101.5		Average		1.0227	1.390	410.1	108.3	

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.031	339.51	983.7	764.7	219.0
Meter Pressure (iwg)	1.363	415.406	796.2	747.4	48.8
Stack Temperature (F	400.133	75.896	654.9	654.2	0.7
Meter Temperature (F)	82.917		1047.1	1033.1	14.0
Meter Volume (acf)	75.896			50	-50.0
Liquid Volume (ml)	232.500				232.5

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.036	417	916.8	677.1	239.7
Meter Pressure (iwg)	1.380	495.404	722.9	696.2	26.7
Stack Temperature (F	408.500	78.404	508.4	505.2	3.2
Meter Temperature (F)	101.467		963.9	934	29.9
Meter Volume (acf)	78.404			50	-50.0
Liquid Volume (ml)	249.500				249.5

		Meter Vol	Imp	Imp	
Delta P (iwg)	1.023	497	979.1	774.1	205.0
Meter Pressure (iwg)	1.390	575.783	837.0	766.7	70.3
Stack Temperature (F	410.067	78.783	655.6	655	0.6
Meter Temperature (F	108.267		956.5	939.1	17.4
Meter Volume (acf)	78.783			50	-50.0
Liquid Volume (ml)	243.3				243.3

Appendix B.3
Unit 2 Calculations

Appendix B.3.1
Unit 2 Gaseous Calculations

MOBILE EMISSION LABORATORY
CONTINUOUS GASEOUS MEASUREMENTS SUMMARY

Client:	Desert View Power		Condition:	----	
Unit:	Unit 2		Load:	> 90%	
Location:	Mecca		Date	9/9/2020	

	O2%	CO2%				
Analyzer Range:	20	20				
Span Value:	10.48	10.48				
	O2%	CO2%				
As Found	10.509	10.601				
Linearity	0.1%	0.6%			<2%	**Pass**
9/9/2020	O2%	CO2%				
1-CEM-U2						
Analyzer Range:	20	20				
Span Value:	10.48	10.48				
Pre test Direct Zero	-0.01	0.02				
Pre test Direct Span	10.51	10.60				
System Zero	0.03	0.07				
System Span	10.48	10.54				
Average	8.64	11.77				
System Zero	0.02	0.04				
System Span	10.43	10.42				
Post test Direct Zero	-0.01	0.02				
Post test Direct Span	10.47	10.51				
Corrected Conc.	8.66	11.79				
System Bias Check						
Zero Pre-test	0.13%	0.33%			< 5%	**PASS**
Zero Post-test	0.08%	0.21%			< 5%	**PASS**
Span Pre-test	0.00%	0.27%			< 5%	**PASS**
Span Post-test	-0.26%	-0.32%			<5%	**PASS**

9/9/2020	O2%	CO2%				
2-CEM-U2						
Analyzer Range:	20	20				
Span Value:	10.48	10.48				
Pre test Direct Zero	-0.01	0.02				
Pre test Direct Span	10.47	10.51				
System Zero	0.02	0.04				
System Span	10.43	10.42				
Raw concentration	8.48	11.81				
System Zero	0.01	0.05				
System Span	10.34	10.47				
Post test Direct Zero	-0.03	0.02				
Post test Direct Span	10.42	10.53				
Corrected Conc.	8.56	11.86				
System Bias Check						
Zero Pre-test	0.08%	0.21%			< 5%	**PASS**
Zero Post-test	0.05%	0.24%			< 5%	**PASS**
Span Pre-test	-0.26%	-0.32%			< 5%	**PASS**
Span Post-test	-0.71%	-0.06%			<5%	**PASS**

9/9/2020	O2%	CO2%				
3-CEM-U2						
Analyzer Range:	20	20				
Span Value:	10.48	10.48				
Pre test Direct Zero	-0.03	0.02				
Pre test Direct Span	10.42	10.53				
System Zero	0.01	0.05				
System Span	10.34	10.47				
Raw concentration	8.47	11.76				
System Zero	0.01	0.08				
System Span	10.24	10.44				
Post test Direct Zero	-0.03	0.02				
Post test Direct Span	10.30	10.53				
Corrected Conc.	8.63	11.80				
System Bias Check						
Zero Pre-test	0.05%	0.24%			< 5%	**PASS**
Zero Post-test	0.04%	0.41%			< 5%	**PASS**
Span Pre-test	-0.71%	-0.06%			< 5%	**PASS**
Span Post-test	-1.20%	-0.22%			<5%	**PASS**

Appendix B.3.2
Unit 2 Hydrogen Chloride Calculations

EPA METHOD 26A SOURCE TEST

DATA AND WORKSHEET

Client	Desert View Power Parameter			Full Load
Loaction	Mecca	Fuel		Biomass
Unit	Unit 2	Data By		DW
Test Number	1-HCL-U2	2-HCL-U2	3-HCL-U2	Average
Reference Temperature, F	68	68	68	
Test Date	9/9/2020	9/9/2020	9/9/2020	
Sample Train	17-WCS	17-WCS	17-WCS	-
Pitot Factor	0.840	0.840	0.840	-
Meter Calibration Factor	0.984	0.984	0.984	-
Stack Area (sq ft)	38.84	38.84	38.84	-
Sample Time (Min)	120	120	120	120
Barometric Pressure (in Hg)	30.05	30.05	30.17	30.09
Nozzle Diam (in)	0.221	0.221	0.221	0.221
Start/Stop Time	810/1016	1030/1235	1247/1452	-
Stack Pressure (iwg)	0.30	0.30	0.30	0.30
Delta P (iwg)	1.013	1.014	1.022	1.016
Meter Pressure (iwg)	1.20	1.23	1.22	1.22
Stack Temperature (F)	373.7	373.7	380.4	375.9
Meter Temperature (F)	90.9	104.8	107.6	101.1
Meter Volume (acf)	79.764	82.891	82.517	81.724
Liquid Volume (ml)	237.7	231.3	242.7	237.2
Stack O2 (%)	8.66	8.56	8.63	8.61
Stack CO2 (%)	11.79	11.86	11.80	11.82
Standard Sample Volume (SCF)	75.761	76.799	76.385	76.315
Moisture Fraction	0.129	0.124	0.130	0.128
Molecular Weight (wet)	28.65	28.72	28.64	28.67
Stack Gas Velocity (ft/sec)	70.99	70.93	71.46	71.12
Stack Flow Rate (wacfm)	165,425	165,300	166,526	165,750
Stack Flow Rate (dscfm)	91,692	92,099	91,787	91,859
Isokinetic Ratio (%)	100.36	101.28	101.08	100.91
mg/sample	54.0	44.3	57.2	51.8
mg/dscm	25.17	20.37	26.44	23.99
ppm (as HCl)	16.59	13.43	17.43	15.82
lb/hr (as HCl)	8.64	7.02	9.08	8.25
MMBtu/Hr	372	372	372	372
Lb/MMBtu	0.023	0.019	0.024	0.022

1-HCL-U2							2-HCL-U2							3-HCL-U2						
	dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm			dP	(dP)^.5	dH	Ts	Tm	
5	1.00	1.000	1.10	375	84	86	5	1.00	1.000	1.30	375	101	100	5	1.10	1.049	1.30	373	105	108
4	0.98	0.990	1.10	376	84	87	4	1.10	1.049	1.40	374	102	103	4	1.20	1.095	1.40	372	105	108
3	0.93	0.964	1.00	376	84	86	3	1.20	1.095	1.50	374	103	104	3	1.00	1.000	1.20	374	106	108
2	0.95	0.975	1.00	374	84	86	2	1.10	1.049	1.40	374	103	105	2	1.00	1.000	1.20	375	105	107
1	0.97	0.985	1.10	375	83	85	1	1.00	1.000	1.30	373	103	105	1	0.95	0.975	1.10	373	104	107
5	1.20	1.095	1.30	373	83	85	5	1.10	1.049	1.40	372	104	106	5	1.20	1.095	1.40	375	104	106
4	1.30	1.140	1.40	374	86	87	4	1.20	1.095	1.50	373	104	106	4	1.10	1.049	1.30	378	105	107
3	1.20	1.095	1.30	373	86	88	3	1.00	1.000	1.30	373	104	106	3	1.10	1.049	1.30	379	106	108
2	1.00	1.000	1.10	372	87	88	2	1.10	1.049	1.30	374	103	107	2	0.97	0.985	1.20	380	106	108
1	0.93	0.964	1.00	373	88	89	1	1.00	1.000	1.20	373	103	106	1	0.94	0.970	1.10	381	107	109
5	0.90	0.949	1.00	373	88	89	5	1.00	1.000	1.20	374	104	106	5	0.89	0.943	1.10	382	107	109
4	0.85	0.922	0.98	372	89	90	4	0.98	0.990	1.20	375	103	105	4	0.87	0.933	1.00	383	108	110
3	0.83	0.911	0.99	373	89	90	3	0.95	0.975	1.10	373	104	106	3	0.85	0.922	1.00	382	107	110
2	0.80	0.894	0.96	372	88	91	2	0.93	0.964	1.10	372	104	106	2	0.83	0.911	0.99	381	107	110
1	0.84	0.917	1.00	373	89	91	1	0.90	0.949	1.00	373	104	106	1	0.85	0.922	1.00	382	107	110
5	1.00	1.000	1.20	373	90	92	5	0.92	0.959	1.10	373	104	107	5	1.20	1.095	1.40	380	107	109
4	1.10	1.049	1.30	374	91	93	4	0.87	0.933	1.00	374	104	106	4	1.10	1.049	1.30	381	106	108
3	0.98	0.990	1.20	375	92	93	3	0.85	0.922	1.00	374	104	106	3	1.00	1.000	1.20	382	106	109
2	0.94	0.970	1.10	373	93	94	2	0.82	0.906	0.98	375	105	106	2	0.97	0.985	1.20	382	107	110
1	0.90	0.949	1.10	374	93	95	1	0.80	0.894	0.96	374	105	106	1	0.94	0.970	1.10	383	106	109
5	1.10	1.049	1.30	373	92	95	5	1.20	1.095	1.40	373	105	107	5	1.00	1.000	1.20	381	106	110
4	1.20	1.095	1.50	374	93	95	4	1.30	1.140	1.60	374	105	107	4	1.10	1.049	1.30	382	106	110
3	1.10	1.049	1.40	372	94	96	3	1.10	1.049	1.30	375	105	107	3	1.00	1.000	1.20	383	105	109
2	1.10	1.049	1.40	373	95	96	2	1.00	1.000	1.20	375	104	107	2	1.10	1.049	1.30	384	106	110
1	1.00	1.000	1.30	374	96	97	1	0.94	0.970	1.10	374	104	106	1	0.98	0.990	1.20	383	106	111
5	1.00	1.000	1.30	376	95	97	5	1.10	1.049	1.30	372	104	106	5	1.10	1.049	1.30	385	107	111
4	1.10	1.049	1.40	375	96	97	4	1.00	1.000	1.20	373	104	106	4	1.20	1.095	1.40	383	106	110
3	1.20	1.095	1.50	374	96	97	3	1.00	1.000	1.20	373	103	106	3	1.10	1.049	1.30	384	106	110
2	1.10	1.049	1.40	373	97	98	2	1.10	1.049	1.30	374	104	107	2	1.10	1.049	1.30	385	106	111
1	1.00	1.000	1.30	373	98	98	1	0.95	0.975	1.10	375	104	108	1	1.00	1.000	1.20	384	107	111
Average		1.0130	1.201	373.7	90.9		Average		1.0136	1.231	373.7	104.8		Average		1.0218	1.216	380.4	107.6	

		Meter Vol	Imp	Imp			Meter Vol	Imp	Imp			Meter Vol	Imp	Imp	
Delta P (iwg)	1.013	182.100	928.4	674.6	253.8	Delta P (iwg)	1.014	264.5	985.4	762.7	222.7	Delta P (iwg)	1.022	350.4	936.6	692.6	244.0
Meter Pressure (iwg)	1.201	261.864	675.2	668.1	7.1	Meter Pressure (iwg)	1.231	347.391	788.1	754.8	33.3	Meter Pressure (iwg)	1.216	432.917	717.2	704.8	12.4
Stack Temperature (F)	373.667	79.764	509.5	508.2	1.3	Stack Temperature (F)	373.667	82.891	655.0	653.4	1.6	Stack Temperature (F	380.400	82.517	510.0	507.1	2.9
Meter Temperature (F)	90.900		993.9	968.4	25.5	Meter Temperature (F)	104.800		1033.1	1009.4	23.7	Meter Temperature (F	107.583		955.1	921.7	33.4
Meter Volume (acf)	79.764			50	-50.0	Meter Volume (acf)	82.891			50	-50.0	Meter Volume (acf)	82.517			50	-50.0
Liquid Volume (ml)	237.700				237.7	Liquid Volume (ml)	231.300				231.3	Liquid Volume (ml)	242.7				242.7

Appendix B.4
MMBtu/hr Calculations

2019 Annual Average MMBtu/Hr Calculation

Period Hours	17,520		
Boiler #1 Operating Hours	7,856		
Boiler #2 Operating Hours	8,004		
Total Operating Hours	15,860		
Gross Generation	389,493		
Net Generation	342,279		
Hazen Fuel Analysis	7,919	HHV Btu	
Hazen Fuel Analysis		LHV Btu	
2019 Fuel Records	375,296	tons purchased	
	7,219	System loss	
	7,316	Net change in inventory (final - initial)	
	360,760	tons consumed	
	0.93	tons/MWh	Gross
	1.05	**tons/MWh**	**Net**
	721,520,347	pounds consumed	
	5,713,388,931,067	Btu wood	HHV
	0	Btu wood	LHV
	5,713,389	MMBtu wood	HHV
	0	MMBtu wood	LHV
	62,948	MMBtu gas	1.10%
	15,860	operating hours	
Annual avg, Units 1 & 2	364	MMBtu/hr	HHV
Annual avg, Units 1 & 2	4	MMBtu/hr	LHV

UNIT 1

Average MMBtu/Hr Calculation				
Stack test date:	9/10/2020			
Avg daily steam production, Unit 1	207.9	kpph		*Average daily value*
Avg daily steam production, Unit 2	205.2	kpph		*Average daily value*
Burn rate during stack test (annual)	1.05			
Boiler #1 Operating Hours	24			
Boiler #2 Operating Hours	24			
Net Generation	1,078	MWh		*Daily net MW*
Fuel Analysis	8,048	HHV Btu		
Fuel Analysis	0	LHV Btu		
Tested Unit	208	kpph		
Fuel consumption	1,136	tons consumed total		
Fuel consumption, tested unit	572	tons consumed total		
	9,203,502,050	Btu wood	HHV	
	0	Btu wood	LHV	
	9,204	MMBtu wood	HHV	
	0	MMBtu wood	LHV	
	0	MMBtu gas	0.00%	
	24	operating hours		
Heat input during test (tested unit)	**383**	**MMBtu/hr**	**HHV**	
Heat input during test (tested unit)	0	MMBtu/hr	LHV	

UNIT 2

Average MMBtu/Hr Calculation				
Stack test date:	9/9/2020			
Avg daily steam production, Unit 1	205.6	kpph		*Average da*
Avg daily steam production, Unit 2	207.9	kpph		*Average da*
Burn rate during stack test (annual)	1.05			
Boiler #1 Operating Hours	24			
Boiler #2 Operating Hours	24			
Net Generation	1,080	MWh		*Daily net M*
Fuel Analysis	7,789	HHV Btu		
Fuel Analysis	0	LHV Btu		
Tested Unit	208	kpph		
Fuel consumption	1,138	tons consumed total		
Fuel consumption, tested unit	572	tons consumed total		
	8,916,053,515	Btu wood	HHV	
	0	Btu wood	LHV	
	8,916	MMBtu wood	HHV	
	0	MMBtu wood	LHV	
	0	MMBtu gas	0.00%	
	24	operating hours		
Heat input during test (tested unit)	**372**	**MMBtu/hr**	HHV	
Heat input during test (tested unit)	0	MMBtu/hr	LHV	

APPENDIX C
QUALITY ASSURANCE

Appendix C.1
Quality Assurance Program Summary

QUALITY ASSURANCE PROGRAM SUMMARY

As part of Montrose Air Quality Services, LLC (MAQS) ASTM D7036-04 certification, MAQS is committed to providing emission related data which is complete, precise, accurate, representative, and comparable. MAQS quality assurance program and procedures are designed to ensure that the data meet or exceed the requirements of each test method for each of these items. The quality assurance program consists of the following items:

- Assignment of an Internal QA Officer
- Development and use of an internal QA Manual
- Personnel training
- Equipment maintenance and calibration
- Knowledge of current test methods
- Chain-of-custody
- QA reviews of test programs

Assignment of an Internal QA Officer: MAQS has assigned an internal QA Officer who is responsible for administering all aspects of the QA program.

Internal Quality Assurance Manual: MAQS has prepared a QA Manual according to the requirements of ASTM D7036-04 and guidelines issued by EPA. The manual documents and formalizes all of MAQS QA efforts. The manual is revised upon periodic review and as MAQS adds capabilities. The QA manual provides details on the items provided in this summary.

Personnel Testing and Training: Personnel testing and training is essential to the production of high quality test results. MAQS training programs include:

- A requirement for all technical personnel to read and understand the test methods performed
- A requirement for all technical personnel to read and understand the MAQS QA manual
- In-house testing and training
- Quality Assurance meetings
- Third party testing where available
- Maintenance of training records.

Equipment Maintenance and Calibration: All laboratory and field equipment used as a part of MAQS emission measurement programs is maintained according to manufacturer's recommendations. A summary of the major equipment maintenance schedules is summarized in Table 1. In addition to routine maintenance, calibrations are performed on all sampling equipment according to the procedures outlined in the applicable test method. The calibration intervals and techniques for major equipment components is summarized in Table 2. The calibration technique may vary to meet regulatory agency requirements.

Knowledge of Current Test Methods: MAQS maintains current copies of EPA, ARB, and SCAQMD Source Test Manuals and Rules and Regulations.

Chain-of-Custody: MAQS maintains chain-of-custody documentation on all data sheets and samples. Samples are stored in a locked area accessible only to MAQS source test personnel. Data sheets are kept in the custody of the originator, program manager, or in locked storage until return to MAQS office. Electronic field data is duplicated for backup on secure storage media. The original data sheets are used for report preparation and any additions are initialed and dated.

QA Reviews: Periodic field, laboratory, and report reviews are performed by the in-house QA coordinator. Periodically, test plans are reviewed to ensure proper test methods are selected and reports are reviewed to ensure that the methods were followed and any deviations from the methods are justified and documented.

ASTM D7036-04 Required Information

Uncertainty Statement

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is presented in the report appendices.

Performance Data

Performance data are available for review.

Qualified Personnel

A qualified individual (QI), defined by performance on a third party or internal test on the test methods, will be present on each test event.

Plant Entry and Safety Requirements

Plant Entry

All test personnel are required to check in with the guard at the entrance gate or other designated area. Specific details are provided by the facility and project manager.

Safety Requirements

All personnel shall have the following personal protective equipment (PPE) and wear them where designated:

- Hard Hat
- Safety Glasses
- Steel Toe Boots
- Hearing Protection
- Gloves
- High Temperature Gloves (if required)

The following safety measures will be followed:

- Good housekeeping
- SDS for all on-site hazardous materials
- Confine selves to necessary areas (stack platform, mobile laboratory, CEMS data acquisition system, control room, administrative areas)
- Knowledge of evacuation procedures

Each facility will provide plant specific safety training.

TABLE 1
EQUIPMENT MAINTENANCE SCHEDULE

Equipment	Acceptance Limits	Frequency of Service	Methods of Service
Pumps	1. Absence of leaks 2. Ability to draw manufacturers required vacuum and flow	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Replace parts 4. Leak check
Flow Meters	1. Free mechanical movement	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero span gas	As recommended by manufacturer	As recommended by manufacturer
Integrated Sampling Tanks	1. Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobile Van Sampling System	1. Absence of leaks	Depends on nature of use	1. Change filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling lines	1. Sample degradation less than 2%	After each test series	1. Blow dry, inert gas through line until dry

TABLE 2
MAJOR SAMPLING EQUIPMENT CALIBRATION REQUIREMENTS

Sampling Equipment	Calibration Frequency	Calibration Procedure	Acceptable Calibration Criteria
Continuous Analyzers	Before and After Each Test Day	3-point calibration error test	< 2% of analyzer range
Continuous Analyzers	Before and After Each Test Run	2-point sample system bias check	< 5% of analyzer range
Continuous Analyzers	After Each Test Run	2-point analyzer drift determination	< 3% of analyzer range
CEMS System	Beginning of Each Day	leak check	< 1 in. Hg decrease in 5 min. at > 20 in. Hg
Continuous Analyzers	Semi-Annually	3-point linearity	< 1% of analyzer range
NO_x Analyzer	Daily	NO_2 -> NO converter efficiency	> 90%
Differential Pressure Gauges (except for manometers)	Semi-Annually	Correction factor based on 5-point comparison to standard	+/- 5%
Differential Pressure Gauges (except for manometers)	Bi-Monthly	3-point comparison to standard, no correction factor	+/- 5%
Barometer	Semi-Annually	Adjusted to mercury-in-glass or National Weather Service Station	+/- 0.1 inches Hg
Dry Gas Meter	Semi-Annually	Calibration check at 4 flow rates using a NIST traceable standard	+/- 2%
Dry Gas Meter	Bi-Monthly	Calibration check at 2 flow rates using a NIST traceable standard	+/- 2% of semi-annual factor
Dry Gas Meter Orifice	Annually	4-point calibration for ΔH@	--
Temperature Sensors	Semi-Annually	3-point calibration vs. NIST traceable standard	+/- 1.5%

Note: Calibration requirements will be used that meet applicable regulatory agency requirements.

Appendix C.2
CARB, SCAQMD, and STAC Certifications

State of California

California Air Resources Board

Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2022, for those test methods listed below:

CARB Source Test Methods:
1, 2, 3, 4, 5, 6, 8, 17, 20
100 (CO, CO_2, NOx, O_2, SO_2, THC)

Catherine Dunwoody, Chief
Monitoring and Laboratory Division

State of California

California Air Resources Board

Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2022, for those test methods listed below:

U.S. EPA Source Test Methods 201A, 202 and 205
Visible Emissions Evaluation

Catherine Dunwoody, Chief
Monitoring and Laboratory Division

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

September 6, 2019

Mr. John Peterson
Montrose Air Quality Services, LLC
1631 E. Saint Andrew Place
Santa Ana, CA 92705

Subject: LAP Approval Notice
Reference # 96LA1220

Dear Mr. Peterson:

We have reviewed your renewal letter under the South Coast Air Quality Management District's Laboratory Approval Program (LAP). We are pleased to inform you that your firm is approved for the period beginning September 30, 2019, and ending September 30, 2020 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

Methods 1-4	Methods 5.1, 5.2, 5.3, 6.1
Methods 10.1 and 100.1	Methods 25.1 and 25.3 (Sampling)
USEPA CTM-030 and ASTM D6522-00	Rule 1121/ 1146.2 Protocol
Rule 1420/1420.1/1420.2 – (Lead) Source and Ambient Sampling	

Your LAP approval to perform nitrogen oxide emissions compliance testing for Rule 1121/ 1146.2 Protocols includes satellite facilities located at:

McKenna Boiler 1510 North Spring Street Los Angeles, CA 90012	Noritz America Corp. 11160 Grace Avenue Fountain Valley, CA 92708	Ajax Boiler, Inc. 2701 S. Harbor Blvd. Santa Ana, CA 92704

Laundry Building of VA Greater Los Angeles Healthcare System
508 Constitution Avenue
Los Angeles, CA 90049

Thank you for participating in the LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

D. Sarkar

Dipankar Sarkar
Program Supervisor
Source Test Engineering

DS:GK/gk
Attachment

190906 LapRenewalRev.doc

Cleaning the air that we breathe...

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

MONTROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 11th day of February 2020.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3925.01
Valid to February 28, 2022

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

Appendix C.3
Individual QI Certifications

CERTIFICATE OF COMPLETION

Dave Wonderly

This document certifies that this individual has passed a comprehensive examination and is now a Qualified Individual (QI) as defined in Section 8.3 of ASTM D7036-04 for the following method(s):

Source Evaluation Society Group 1: EPA Manual Gas Volume and Flow Measurements and Isokinetic Particulate Sampling Methods

Certificate Number: 002-2018-66

Tate Strickler, Accreditation Director

DATE OF ISSUE: 11/29/18

DATE OF EXPIRATION: 11/29/23

MONTROSE ENVIRONMENTAL

CERTIFICATE OF COMPLETION

Dave Wonderly

This document certifies that this individual has passed a comprehensive examination and is now a Qualified Individual (QI) as defined in Section 8.3 of ASTM D7036-04 for the following method(s):

Source Evaluation Society Group 2: EPA Manual Gaseous Pollutants Source Sampling Methods

Certificate Number: 002-2018-67

Tate Strickler, Accreditation Director

DATE OF ISSUE: 11/29/18

DATE OF EXPIRATION: 11/29/23

MONTROSE ENVIRONMENTAL

CERTIFICATE OF COMPLETION

Dave Wonderly

This document certifies that this individual has passed a comprehensive examination and is now a Qualified Individual (QI) as defined in Section 8.3 of ASTM D7036-04 for the following method(s):

Source Evaluation Society Group 3: EPA Gaseous Pollutants Instrumental Methods

Certificate Number: 002-2018-60

Tate Strickler

Tate Strickler, Accreditation Director

DATE OF ISSUE: 9/28/18

DATE OF EXPIRATION: 9/28/23

MONTROSE ENVIRONMENTAL

APPENDIX D
TEST PLAN

TEST PLAN FOR
2020 EMISSIONS PERFORMANCE TESTING AT THE DESERT VIEW POWER PLANT

Prepared For:

Desert View Power
62-300 Gene Welmas Dr.
Mecca, California 92254-0758

For Submittal To:

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4178

Prepared By:

Montrose Air Quality Services, LLC
1631 E. St. Andrew PL.
Santa Ana, California 92705
(714) 279-6777

Dave Wonderly

Production Date: **January 13, 2020**
Document Number: **W002AS-678786-PP-86**

CONFIDENTIALITY STATEMENT

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REVIEW AND CERTIFICATION

I certify that, to the best of my knowledge, the information contained in this document is complete and accurate and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: _____ Date: 1/15/2020

Name: Dave Wonderly Title: Client Project Manager

I have reviewed, technically and editorially, details and other appropriate written materials contained herein. I hereby certify that to the best of my knowledge the presented material is authentic and accurate and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: _____ Date: 1/15/2020

Name: Matt McCune Title: Regional Vice President

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

Montrose Air Quality Services, LLC (MAQS) has been contracted by Desert View Power to conduct annual emissions compliance testing on two Fluid Bed Boilers, and a relative accuracy test audit (RATA) of the continuous emissions monitoring system (CEMS) at the Desert View Power Plant located in Mecca, California. MAQS will conduct testing to comply with U.S. Environmental Protection Agency Operating Permit NSR 4-4-11;SE 87-01 including amendments through August 14, 2003: 7th Amendment Title V permit to operate CB-OP 99-01 dated 8/1/2000 and 40 CFR 60, Appendix F. This test plan presents the testing procedures, a description of the sample locations and a summary of quality assurance procedures.

David Wonderly will coordinate the testing for MAQS and can be reached at (714) 279-6777. The on-site test team will consist of a Project Manager whose responsibilities include interfacing with facility personnel, operating the mobile emission measurement laboratory, and performing data entry as well as Technician(s) responsible for all stack responsibilities. A Qualified Individual, as defined in ASTM D7036-04, will be on-site for all methods performed.

Emissions tests will be performed on each Biomass fired boiler as specified in the permit for:

- Particulate
- NO_x, CO and SO_2
- Hydrocarbons
- Hydrogen Chloride (HCl)
- Method 19 F-Factor Using ASTM D6323 and ASTM E711 for Fuel BTU/lb
- Volumetric Flow Rate
- Oxygen and Carbon Dioxide concentration
- Flue gas moisture content

A relative accuracy test audit will be performed to satisfy the requirements of 40 CFR 60, Appendix F, as part of the quarterly CEMS testing. The Continuous Emissions Monitoring System (CEMS) Relative Accuracy Test Audit includes NO_x, CO and SO_2.

2.0 UNIT DESCRIPTION

The Desert View Power Plant consists of two 297 MMBtu/hour, circulating bed, biomass-fired boilers, and combined unit are designed to produce 47 MW of net electrical output. Each unit is equipped with the following pollution control systems:

- An ammonia injection system for control of NO_x emissions;
- Cyclonic mixing of injected ammonia with flue gas to provide for a minimum amount of ammonia slip (emission);
- A limestone injection system to limit emissions of SO_2;
- A hydrated lime injection system to limit emissions of HCL;
- A reverse air baghouse to restrict opacity and emissions of sulfates and particulate to very low levels.

The plant CEM system for each unit includes measurements of NO_x, CO, O_2, O_2 wet, SO_2, CO_2, flow and opacity. It is an extractive system with a heated line extending from the probe to the CEM unit. Table 2-1 presents the current CEMS configuration.

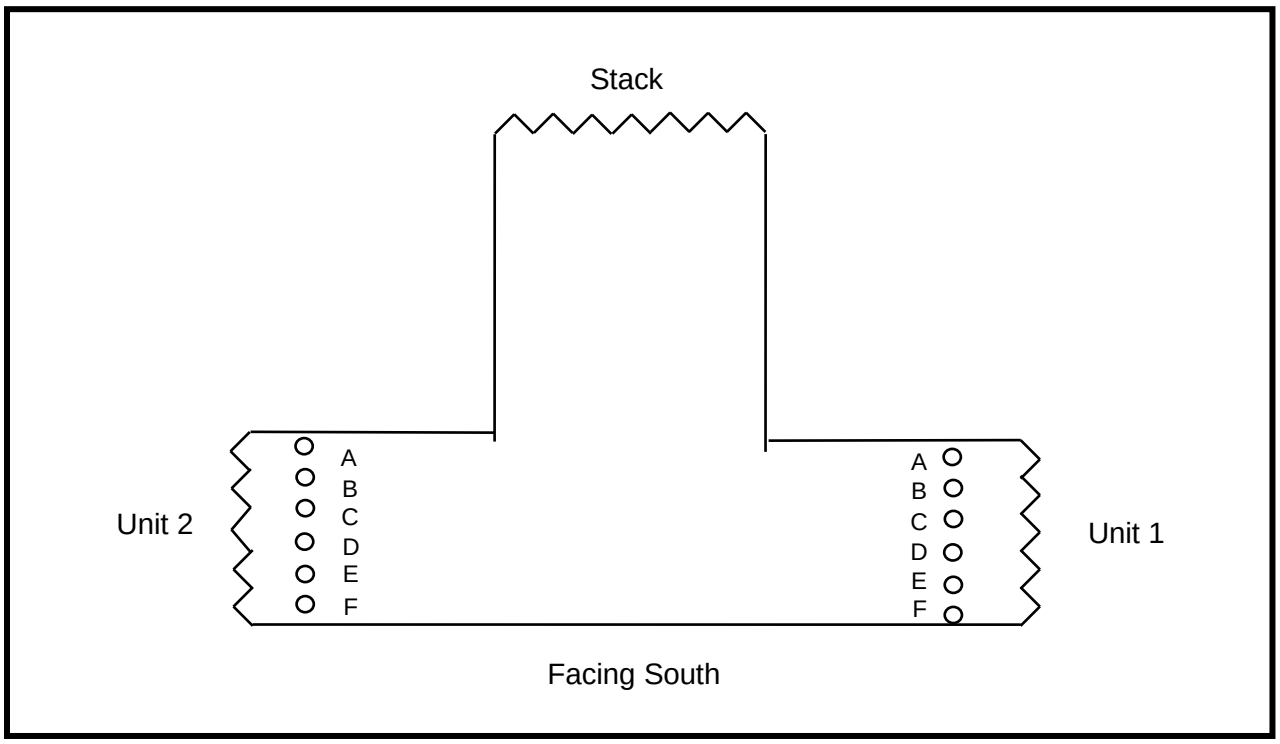
TABLE 2-1
CONTINUOUS EMISSION MONITOR SYSTEM
DESERT VIEW POWER PLANT

Species	Manufacturer	Model	Range
NO_x	CAI	ZRE-5 Multi Component Analyzer	100 and 500 ppm
CO	CAI	ZRE-5 Multi Component Analyzer	100 and 500 ppm
O_2 Dry	CAI	ZRE-5 Multi Component Analyzer	25%
SO_2	CAI	ZRE-5 Multi Component Analyzer	50 and 500 ppm
CO_2	CAI	ZRE-5 Multi Component Analyzer	20%
O_2 Wet	AMETEK	Thermox 2000	25%
Flow	Diet Greg Standard	--	Msdcfh
Opacity	Monitor Labs	Lighthawk 560	100%

2.1 SAMPLE LOCATIONS

Samples will be collected from the transition ducts to the stack. Carnot Technical Services, Inc. conducted three dimensional flow testing and stratification testing on the transition exhaust ducts on each unit. This testing was conducted in accordance to SCAQMD chapter X section 1 and 13 and will be presented in the report titled "Stack Gas Stratification and Absence of Flow Disturbance Testing at Desert View Power Mecca Project" (R106E622.T) submitted to SCAQMD in October of 1994. The sample locations met all the requirements. Copies of the results from that report can be found in Appendix B .All testing for both Unit 1 and 2 will be done at the sample location presented in Figure 2-1.

FIGURE 2-1
DESERT VIEW POWER SAMPLE LOCATION



2.2 UNIT OPERATION

The tests will be conducted at or near maximum steady state unit load conditions. Limestone injection rate, fuel combustion rate, ammonia injection rate, ash handling operations, excess air level, combustion air distribution, and combustion temperature will all be set to maintain stable unit operation. Pertinent operating conditions will be recorded by Desert View Power personnel during the tests. Full load will be defined as greater than 267 MMBtu/hr of total (biomass and natural gas) heat input to the boiler.

3.0 TEST PROCEDURES

The test procedures to be used are listed in Table 3-1. Part of the gaseous plant emissions performance testing data will be used for CEMS RATA determinations. A minimum of nine reference method tests are required for all gaseous species relative accuracy (RA) determinations.

TABLE 3-1
PROPOSED TEST MATRIX PER UNIT
DESERT VIEW POWER MECCA PROJECT

Parameter	No. of Tests	Measurement Principle	Reference Method	Duration per Test
NO_x	9(1)	Chemiluminescence	EPA 7E	60/30 minutes
CO	9(1)	Non-Dispersive Infrared	EPA 10	60/30 minutes
O_2/CO_2	9(1)	Non-Dispersive Infrared	EPA 3A	60/30 minutes
PM	3	Gravimetric	EPA 5	90 minutes
SO_2	9(1)	Barium Thorin Titration	EPA 6	60/30 minutes
Hydrocarbons	2	GC/FID	SCAQMD 25.3	60 minute composite
HCL	3	Ion Chromatography	EPA 26A	120 minutes, minimum of 2 DSCM of sample volume
Fuel Sampling	Daily		ASTM D6323	Composite hourly samples
Fuel Btu/lb	Daily		ASTM E711	Composite hourly samples
Fuel Moisture	Daily		ASTM D3173	Composite hourly samples
Fuel Chlorine	Daily		ASTM E776	Composite hourly samples
Stack Gas Flow Rate	--	S-Type Pitot Traverse	EPA 2	--
Moisture	--	Condensation/Gravimetric	EPA 4	--

(1) Includes compliance and RATA test runs.

3.1 CONTINUOUS GASEOUS MEASUREMENTS

NO_x, O_2, CO_2 and CO will be measured according to EPA reference methods using MAQS continuous emissions monitoring system (CEM). NO_x, O_2, CO_2 and CO concentrations will be determined using MAQS mobile emission measurement laboratory. The laboratory is housed in an 18 foot trailer outfitted to provide a clean, quiet, environmentally controlled base for the testing operations. The laboratory has lighting, electrical distribution, air conditioning and heating to support the test instruments and provide for optimal test performance.

Concentrations of these gaseous species are measured using an extractive sampling system consisting of a heated stainless steel probe to minimize reactions, a heat traced Teflon sample line connected to a thermo-electrically cooled sample dryer. Following the dryer, the sample is drawn into a Teflon lined pump where it is pressurized and then filtered for delivery to the gas analysis portion of the system. Gaseous samples will be collected at a single point. Three minimum 60-minute compliance tests will be performed.

NO_x concentration is determined using a California Analytical Instruments (CAI) chemiluminescence analyzer (model 600 Series). The analyzer has full scale ranges from 2.5 to 10,000 ppm. The analyzer is equipped with a vitreous carbon NO_2 - NO converter for the determination of total nitrogen oxides without interference from other nitrogen containing compounds.

Oxygen concentration is determined using a AMI electro-chemical cell analyzer (model # 201). The analyzer has three full scale ranges; 0-5%, 10%, and 25%. The cell contains an electrolytic fluid that reacts with oxygen to generate an electrical signal proportional to the concentration.

CO_2 is measured using a non-dispersive infrared analyzer manufactured by CAI (model # 100 Series). The analyzer has full scale ranges of 0-5%, 10%, 20% and 40%.

CO is measured using a non-dispersive infrared/gas filter correlation analyzer manufactured by TECO (model # 48i). The analyzer has user definable full scale ranges from of 0-10 to 0-10,000 ppm.

The analyzers and sampling system are subjected to a variety of calibration and quality assurance procedures including leak checks, linearity and calibration error determinations before sampling, and system bias and drift determinations as part of each test run. Data are corrected for any observed bias or drift in accordance with the reference methods.

3.2 PARTICULATE MEASUREMENTS

EPA method 5 sampling system will be used to measure the particulate emissions from both Desert View Power units. The sampling system consists of a nozzle, glass probe, 250°F heated filter, two impingers containing DI water, a third empty impinger and a fourth impinger containing silica gel.

The analysis for particulate is summarized in Table 3-2. Gravimetric Analysis will be performed on the probe/nozzle wash and filter.

TABLE 3-2
EPA METHOD 5 ANALYSES

Sample Component	Analysis Procedure
Probe and Nozzle (Front 1/2)	Evaporation/gravimetric
Heated Filter (83 mm)	Bake/gravimetric

3.3 SULFUR DIOXIDE

Sulfur dioxide will be measured according to EPA Method 6. The first three runs will be 60 minutes and will be used to demonstrate compliance and as RATA runs. Subsequent RATA runs will consist of 30 minute tests per the Methods. A barium thorin titration of the hydrogen peroxide impinger samples will yield SO_2 concentrations for nine relative accuracy test runs. The sample system will consist of a heated glass probe connected to the impinger train with an un-heated Teflon sample line. All the unheated portion of the sample train will be recovered and analyzed. Prior to the titrimetric analysis, all SO_x samples will pass through an ion exchange resin. This removes interference associated with ammonium (NH_4^+). The Method 6 train will not include the IPA impinger, which is provided in the method as an option. The H_2O_2 will absorb both SO_2 and SO_3 (if any). SO_3 will be counted as SO_2.

3.4 HYDROCARBON

Samples for hydrocarbon analysis will be collected in clean 6-L Summa Canister and mini water impingers and analyzed according to SCAQMD 25.3. The samples will be analyzed by AtmAA Inc. in Calabasas, CA using TCA/FID or other qualified laboratory. Results will be reported as total non-methane hydrocarbons as carbon.

3.5 HYDROGEN CHLORIDE MEASUREMENTS

Triplicate hydrogen chloride (HCl), samples will be collected using EPA Method 26A. Sampling and analysis for HF and Cl2 which is included in EPA Method 26A will not be performed.
The sampling train consists of:

- A glass nozzle and heated glass probe heated to between 248°F and 273°F
- A Teflon Mat or quartz out-of-stack filter in a glass filter holder heated to 248°F ± 25°F
- Two impingers containing 100 ml of 0.1 N H_2SO_4 for collection of HCl
- One empty impinger
- An impinger containing silica gel

Samples are withdrawn isokinetically from the stack. The Teflon Mat or quartz-fiber filter collects particulate matter. The acidic absorbing solution collect gaseous HCl and is analyzed for HCl by ion chromatography.

The samples are recovered in the following sample fractions:

1. Back half of filter holder, H_2SO_4 Impinger Catch – Weighed for moisture content and recovered with DI water into pre-cleaned HDPE bottle.
2. The filter and probe wash will not be recovered for this test program.

Quality assurance samples collected in the field are:

- A field blank
- A reagent blank: 200 ml of 0.1 N H_2SO_4
- A reagent blank: 200 ml of DI water

The samples will be analyzed by ion chromatography by AAC in Ventura or other qualified laboratory.

3.6 VELOCITY AND MOISTURE

Stack gas velocity and moisture content will be determined by EPA Methods 2 and 4 during the particulate test. Velocity traverses will be performed during each set of compliance tests (NO_x, CO, SO_2 and hydrocarbons) and for each RATA run.

3.7 FUEL ANALYSIS

Daily fuel samples will be collected by Desert View Power personnel. Hourly samples will be taken and composited by the lab prior to analysis. Sampling will be consistent with ASTM D6323 sample collection methodology. MAQS will send the samples out to be analyzed for higher heating value for heat rate calculations, for Btu/lb for calculating the HCL emissions in lb/MMBtu using ASTM E711, for moisture content using ASTM D3173 and for chlorine content using ASTM E776. Copies of the analysis will be included with the final report.

3.8 RELATIVE ACCURACY TEST AUDIT

Relative Accuracy tests will be performed for NO_x, SO_2, CO and O_2 on sub systems of each unit's CEMS. Relative accuracy is determined by comparing the CEMS data to the corresponding reference method (RM) data over nine to twelve test runs. Nine 30-minute minimum tests will be performed for the NO_x, SO_2, CO, and O_2 relative accuracy. Relative accuracy is expressed in terms of the absolute value of the mean of the difference between the monitor value and the reference method value. It is reported in terms of a percentage of the mean reference method value. The computational procedure is summarized by the following equations:

$$\overline{RM} = \frac{1}{n} \sum_{i=1}^{n} RM_1$$

$$\bar{d} = \sum_{i=1}^{n} d_i$$

$$S_d = \left[\frac{\sum_{i=1}^{n} d_i^2 - \frac{\left(\sum_{i=1}^{n} d_i\right)^2}{n}}{n-1} \right]^{\frac{1}{2}}$$

$$CC = t_{0.975} \frac{S_d}{\sqrt{n}} 1$$

$$RA = \frac{|\bar{d}| + |cc|}{\overline{RM}} x100$$

The RA will be determined for the monitoring systems in parts per million dry (ppm) and lb/hr.

3.9 TEST SCHEDULE

The scheduled test dates have been set for March 10 – March 14, 2020 for compliance and RATA testing. A proposed test schedule for on-site testing activities is shown in Table 3-3. This schedule is based on the number of tests and the required sample times.

TABLE 3-3
TEST SCHEDULE

Date	Unit No.	Test No.	Type of Test
3/10/2020	1	--	Set-up
3/11/2020	1	1-3 PM, 1-3 HCL 1-3 Comp RATA testing	Particulate Tests 1-3, HCL Tests 1-3 CEMS RATA and Compliance NO_x, SO_2, CO &VOC Tests 1-3 Fuel Samples
3/12/2020	1	RATA testing Continued	CEMS RATA
3/13/2020	2	1-3 PM, 1-3 HCL 1-3 Comp RATA testing	Particulate Tests 1-3, HCL Tests 1-3 CEMS RATA and Compliance NO_x, SO_2, CO &VOC Tests 1-3 Fuel Samples
3/14/2020	2	RATA testing Continued	CEMS RATA

4.0 REPORTING

MAQS will prepare a comprehensive emissions report that includes all raw data and calculations for the test program. The test format is presented in Table 4-1. The test report will be submitted within 45 days from completion of testing.

TABLE 4-1
REPORT FORMAT

Title page
Report Title
Prepared For
For Submittal To:
Author and reviewer names
Test Dates and Report Issue Date
Report Number

Review Page
Signatures of person who prepared the report and signature of person who reviewed the report

Table of Contents

Introduction and Summary
Identifies the client, source, reason for the test, test date(s), test personnel, client/source personnel, regulatory observers
Summarizes the results of the test, indicates applicable rules and pass/fail criteria and makes a statement regarding the test results
Outlines the organization of remainder of the report.
Table of analysis results

Unit Description
Describes the process which was tested
Describes any applicable control equipment
Test conditions

Test Description
Test methods, replicates, duration, calculations
Test locations
Test critique

Results
Re-states the results of the test and makes a statement regarding compliance with applicable regulations
Results tables with more detail on individual test runs and supporting data

Appendices
A. Test and Laboratory Data
    1. Test Location
    2. Test Data (by type)
    3. Quality Assurance Data
        a. Certification
        b. Equipment Calibration
        c. Calibration Gas Certificate
        d. Chain of Custody
B. Process Operating Data
C. Measurement Procedures
D. Calculations
E. Instrument Strip Charts

APPENDIX A
QUALITY ASSURANCE AND CERTIFICATIONS

QUALITY ASSURANCE PROGRAM SUMMARY

As part of Montrose Air Quality Services, LLC (MAQS) ASTM D7036-04 certification, MAQS is committed to providing emission related data which is complete, precise, accurate, representative, and comparable. MAQS quality assurance program and procedures are designed to ensure that the data meet or exceed the requirements of each test method for each of these items. The quality assurance program consists of the following items:

- Assignment of an Internal QA Officer
- Development and use of an internal QA Manual
- Personnel training
- Equipment maintenance and calibration
- Knowledge of current test methods
- Chain-of-custody
- QA reviews of test programs

Assignment of an Internal QA Officer: MAQS has assigned an internal QA Officer who is responsible for administering all aspects of the QA program.

Internal Quality Assurance Manual: MAQS has prepared a QA Manual according to the requirements of ASTM D7036-04 and guidelines issued by EPA. The manual documents and formalizes all of MAQS QA efforts. The manual is revised upon periodic review and as MAQS adds capabilities. The QA manual provides details on the items provided in this summary.

Personnel Testing and Training: Personnel testing and training is essential to the production of high quality test results. MAQS training programs include:

- A requirement for all technical personnel to read and understand the test methods performed
- A requirement for all technical personnel to read and understand the MAQS QA manual
- In-house testing and training
- Quality Assurance meetings
- Third party testing where available
- Maintenance of training records.

Equipment Maintenance and Calibration: All laboratory and field equipment used as a part of MAQS emission measurement programs is maintained according to manufacturer's recommendations. A summary of the major equipment maintenance schedules is summarized in Table 1. In addition to routine maintenance, calibrations are performed on all sampling equipment according to the procedures outlined in the applicable test method. The calibration intervals and techniques for major equipment components is summarized in Table 2. The calibration technique may vary to meet regulatory agency requirements.

Knowledge of Current Test Methods: MAQS maintains current copies of EPA, ARB, and SCAQMD Source Test Manuals and Rules and Regulations.

Chain-of-Custody: MAQS maintains chain-of-custody documentation on all data sheets and samples. Samples are stored in a locked area accessible only to MAQS source test personnel. Data sheets are kept in the custody of the originator, program manager, or in locked storage until return to MAQS office. Electronic field data is duplicated for backup on secure storage media. The original data sheets are used for report preparation and any additions are initialed and dated.

QA Reviews: Periodic field, laboratory, and report reviews are performed by the in-house QA coordinator. Periodically, test plans are reviewed to ensure proper test methods are selected and reports are reviewed to ensure that the methods were followed and any deviations from the methods are justified and documented.

ASTM D7036-04 Required Information

Uncertainty Statement

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is presented in Section 4.0.

Performance Data

Performance data are available for review.

Qualified Personnel

A qualified individual (QI), defined by performance on a third party or internal test on the test methods, will be present on each test event.

Plant Entry and Safety Requirements

Plant Entry

All test personnel are required to check in with the guard at the entrance gate or other designated area. Specific details are provided by the facility and project manager.

Safety Requirements

All personnel shall have the following personal protective equipment (PPE) and wear them where designated:

- Hard Hat
- Safety Glasses
- Steel Toe Boots
- Hearing Protection
- Gloves
- High Temperature Gloves (if required)

The following safety measures will be followed:

- Good housekeeping
- SDS for all on-site hazardous materials
- Confine selves to necessary areas (stack platform, mobile laboratory, CEMS data acquisition system, control room, administrative areas)
- Knowledge of evacuation procedures

Each facility will provide plant specific safety training.

TABLE 1
EQUIPMENT MAINTENANCE SCHEDULE

Equipment	Acceptance Limits	Frequency of Service	Methods of Service
Pumps	1. Absence of leaks 2. Ability to draw manufacturers required vacuum and flow	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Replace parts 4. Leak check
Flow Meters	1. Free mechanical movement	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero span gas	As recommended by manufacturer	As recommended by manufacturer
Integrated Sampling Tanks	1. Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobil Van Sampling System	1. Absence of leaks	Depends on nature of use	1. Chang filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling lines	1. Sample degradation less than 2%	After each test series	1. Blow dry, inert gas through line until dry

TABLE 2
MAJOR SAMPLING EQUIPMENT CALIBRATION REQUIREMENTS

Sampling Equipment	Calibration Frequency	Calibration Procedure	Acceptable Calibration Criteria
Continuous Analyzers	Before and After Each Test Day	3-point calibration error test	< 2% of analyzer range
Continuous Analyzers	Before and After Each Test Run	2-point sample system bias check	< 5% of analyzer range
Continuous Analyzers	After Each Test Run	2-point analyzer drift determination	< 3% of analyzer range
CEMS System	Beginning of Each Day	leak check	< 1 in. Hg decrease in 5 min. at > 20 in. Hg
Continuous Analyzers	Semi-Annually	3-point linearity	< 1% of analyzer range
NO_x Analyzer	Daily	NO_2 -> NO converter efficiency	> 90%
Differential Pressure Gauges (except for manometers)	Semi-Annually	Correction factor based on 5-point comparison to standard	+/- 5%
Differential Pressure Gauges (except for manometers)	Bi-Monthly	3-point comparison to standard, no correction factor	+/- 5%
Barometer	Semi-Annually	Adjusted to mercury-in-glass or National Weather Service Station	+/- 0.1 inches Hg
Dry Gas Meter	Semi-Annually	Calibration check at 4 flow rates using a NIST traceable standard	+/- 2%
Dry Gas Meter	Bi-Monthly	Calibration check at 2 flow rates using a NIST traceable standard	+/- 2% of semi-annual factor
Dry Gas Meter Orifice	Annually	4-point calibration for ΔH@	--
Temperature Sensors	Semi-Annually	3-point calibration vs. NIST traceable standard	+/- 1.5%

Note: Calibration requirements will be used that meet applicable regulatory agency requirements.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

September 6, 2019

Mr. John Peterson
Montrose Air Quality Services, LLC
1631 E. Saint Andrew Place
Santa Ana, CA 92705

Subject: LAP Approval Notice
Reference # 96LA1220

Dear Mr. Peterson:

We have reviewed your renewal letter under the South Coast Air Quality Management District's Laboratory Approval Program (LAP). We are pleased to inform you that your firm is approved for the period beginning September 30, 2019, and ending September 30, 2020 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

Methods 1-4	Methods 5.1, 5.2, 5.3, 6.1
Methods 10.1 and 100.1	Methods 25.1 and 25.3 (Sampling)
USEPA CTM-030 and ASTM D6522-00	Rule 1121/ 1146.2 Protocol
Rule 1420/1420.1/1420.2 – (Lead) Source and Ambient Sampling	

Your LAP approval to perform nitrogen oxide emissions compliance testing for Rule 1121/ 1146.2 Protocols includes satellite facilities located at:

McKenna Boiler 1510 North Spring Street Los Angeles, CA 90012	Noritz America Corp. 11160 Grace Avenue Fountain Valley, CA 92708	Ajax Boiler, Inc. 2701 S. Harbor Blvd. Santa Ana, CA 92704

Laundry Building of VA Greater Los Angeles Healthcare System
508 Constitution Avenue
Los Angeles, CA 90049

Thank you for participating in the LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

D. Sarkar

Dipankar Sarkar
Program Supervisor
Source Test Engineering

DS:GK/gk
Attachment

190906 LapRenewalRev.doc

Cleaning the air that we breathe...

State of California

Air Resources Board

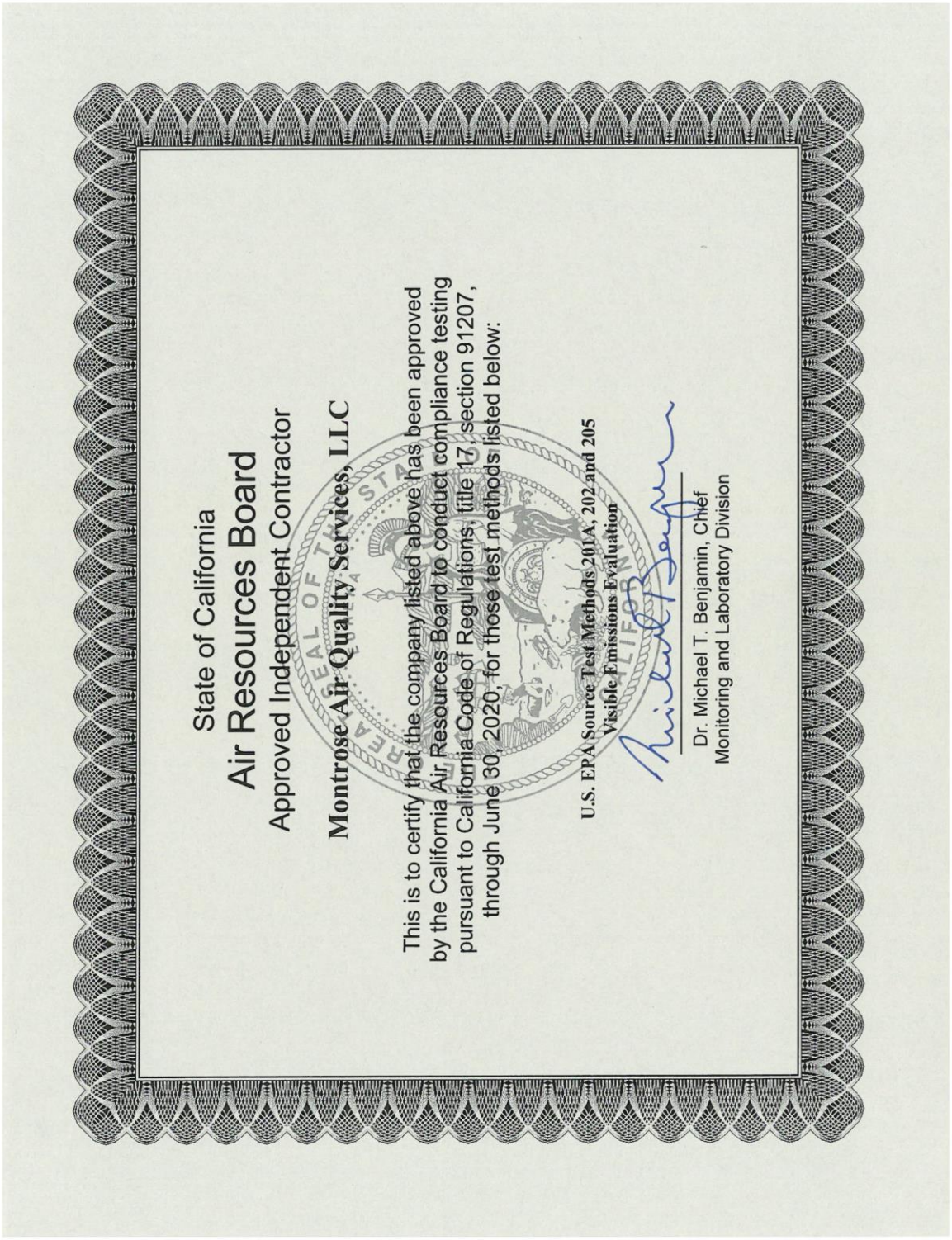
Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for those test methods listed below:

CARB Source Test Methods:
1, 2, 3, 4, 5, 6, 8, 17, 20
100 (CO, CO_2, NO_X, O_2, SO_2, THC)

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division



State of California
Air Resources Board
Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for those test methods listed below:

U.S. EPA Source Test Methods 201A, 202 and 205
Visible Emissions Evaluation

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

MONTROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 5th day of March 2018.

President and CEO
For the Accreditation Council
Certificate Number 3925.01
Valid to February 29, 2020

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

MONTROSE AIR QUALITY SERVICES

APPENDIX B
SAMPLE LOCATION VERIFICATION DATA

STACK GAS STRATIFICATION AND ABSENCE OF FLOW DISTURBANCE TESTING AT COLMAC MECCA PROJECT

Prepared For:

UC Operating Service
Mecca, California

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared By:

Edward J. Filadelfia

CARNOT
Tustin, California

JULY 1994

REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and documented in this report were carried out under my direction and supervision.

Edward J. Filadelfia
Senior Engineer

Date 10/14/94

I have reviewed, technically and editorially, details, calculations, results, conclusions and other appropriate written material contained herein, and hereby certify that the presented material is authentic and accurate.

Edward J. Filadelfia
Senior Engineer

Date 10/14/94

TABLE OF CONTENTS

SECTION 1.0

INTRODUCTION

Carnot was contracted by UC Operating Service (UCOS) to determine the suitability of the alternate sample location accessible from the stack inlet duct. Tests were conducted to determine the level of stack gas stratification and flow disturbance. The tests were performed at this location to satisfy the requirements of alternate sample location CFR 40 Appendix A Method 1. The tests were performed using the standard methods in Chapter X of the SCAQMD's Source Test Manual.

The flow disturbance and gaseous stratification tests were performed on June 27-28, 1994. The test program was coordinated by Greg Deedon of UCOS and Edward Filadelfia of Carnot. The Carnot test team consisted of Edward Filadelfia, Dave Wonderly, and Chris Hone. Unit operation was established and maintained by UCOS personnel.

The results of the tests are summarized in Tables 1-1 and 1-2. These results show that the sample location meets the requirements of the SCAQMD and EPA by demonstrating that the stack gas stratification is less than 10% and the average resultant flow angle is less than 20 degrees with a standard deviation of less than 10 degrees.

A description of the unit is presented in Section 2.0. Test procedures and locations are presented in Section 3.0. Test results are presented in Section 4.0. Tests procedure descriptions, field data sheets, calculations, and control room data are included in the Appendices.

TABLE 1-1
SUMMARY OF GASEOUS STRATIFICATION
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Unit 1 % Stratification	Unit 2 % Stratification	SCAQMD Limit, %
O_2, %	0.4%	1.0%	≤10

TABLE 1-2
SUMMARY OF FLOW DISTURBANCE MEASUREMENTS
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Unit 1 Measured	Unit 2 Measured	SCAQMD Limit, %	EPA Limit, %
Average Resultant Angle, Degrees	5.6°	5.9°	≤20	≤20
Standard Deviation, Degrees	3.3°	4.0°	≤10	N/A

SECTION 2.0

UNIT DESCRIPTION

The Colmac Energy Plant consists of two 297 MMBtu/hour, circulating bed boilers, the combined units are designed to produce 47 MW of net electrical output. Each unit is equipped with the following pollution control systems:

1. An ammonia injection system for control of NO_x emissions.

2. Cyclonic mixing of injected ammonia with flue gas to provide for a minimum amount of ammonia slip (emission).

3. A limestone injection system to limit emissions of SO_2.

4. A reverse air baghouse to restrict opacity and emissions of sulfates and particulate to very low levels.

SECTION 3.0

TEST DESCRIPTION

3.1 TEST CONDITIONS

All tests were performed with the unit operating at full load. Tests were conducted while the unit was firing bio mass and operating under normal conditions. Unit operations were established by UCOS operators.

3.2 SAMPLE LOCATION

Measurements were made from Units 1 and 2 inlet ducts to the stack. A schematic of the Sample location is shown in Figure 3-1. Chapter X sampling consisted of 40 point traverse for stratification, and a 42 point traverse for flow disturbances.

3.3 TEST PROCEDURES

Tests were performed using methods from the SCAQMD's Source Test Manual. These methods are contained in Chapter X - Section 1 for disturbed flow and Section 13 for gaseous stratification. Table 3-1 presents the test methods used in this program. O_2 concentrations were measured using Carnot's mobile emission monitoring system. Flow angles were measured using a United Sensor 3D probe. A description of the Carnot's Continuous Emissions Monitoring System and the standard measurement procedures are presented in Appendix A. A summary of the procedures used for gaseous stratification and disturbed flow are presented below.

3.3.1 Gaseous Stratification

Chapter X (Non-Standard Methods and Techniques), Chapter 13 of the SCAQMD Source Test Manual defines gaseous stratification as the presence of a difference, in excess of 10 percent, between any two points in the same cross sectional plane. Stratification can be determined for either pollutant gases (e.g., NO_x) or diluent gases (e.g., O_2, CO_2) in units of concentration. For this test program, the O_2 concentration was used to measure the level of stack gas stratification.

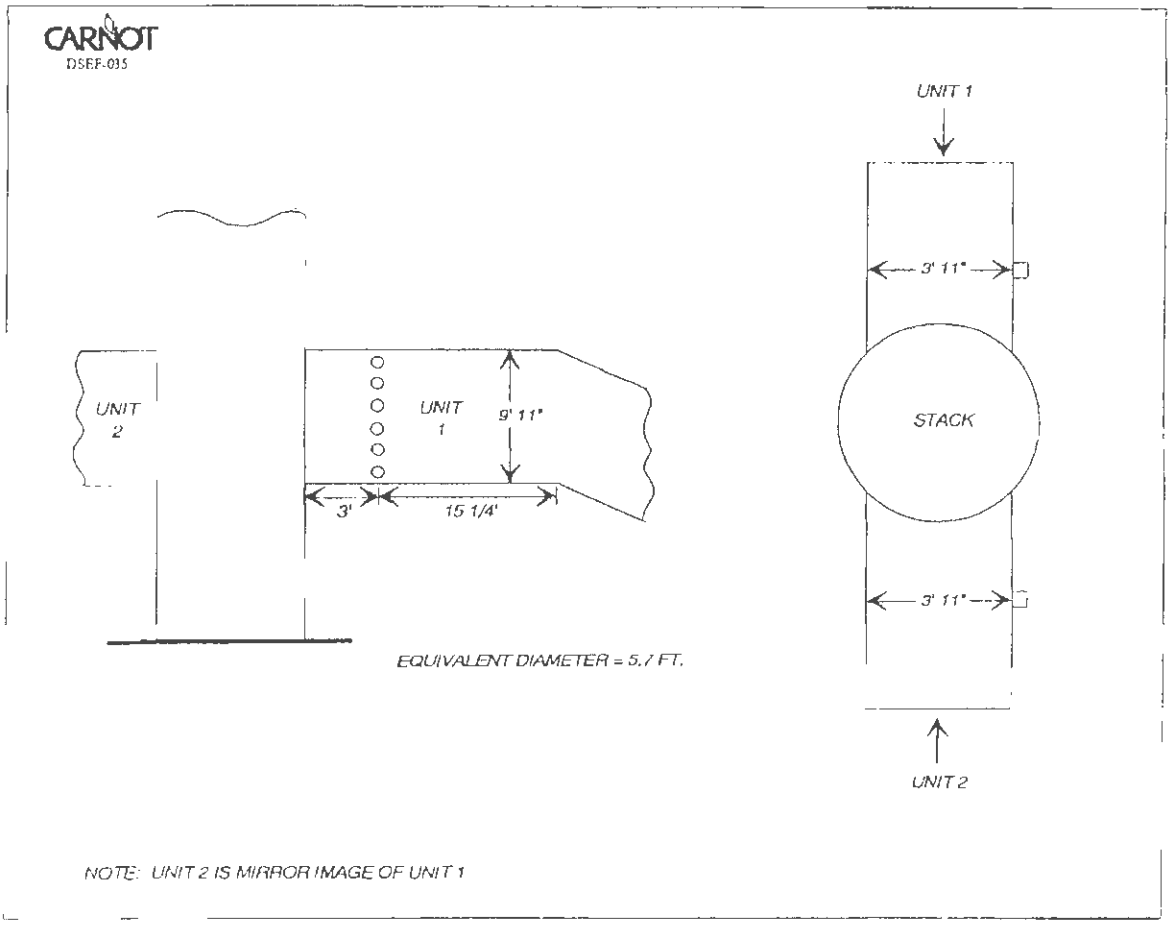


Figure 3-1. UCOS - Duct Sample Locations

Due to variations in process O_2 concentrations, two O_2 analyzers were used. The first O_2 analyzer was used as a reference point and located at the center of the duct. The second was located at 40 traverse points during the test. Gases were monitored for three minutes at each traverse point.

TABLE 3-1
TEST PROCEDURES
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Units	Measurement Principle	Reference Method	Comments
O_2	%	Electrochemical Call	EPA 3A	40 point traverse for gaseous stratification according to Chapter X, Section 13
Flow Angle	Degrees	3D probe for pitch and yaw	1.1	42 point traverse for disturbed flow according to Chapter X, Section 1

SECTION 4.0

RESULTS

4.1 GASEOUS STRATIFICATION

The results of the gaseous stratification tests are summarized in Table 4-1. The results show that the O_2 concentration stratification levels for both sample locations were below the limit of 10%.

TABLE 4-1
GASEOUS STRATIFICATION
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Percent Stratification
Unit 1 O_2, %	0.4%
Unit 2 O_2, %	1.0%

4.2 FLOW DISTURBANCE

The results of the flow disturbance measurements made with the 3-dimensional velocity probe are presented in Table 4-2. The results of these tests show that the average resultant flow angle was below the limit of 20 degrees with a standard deviation of less than 10 degrees for both sample locations.

TABLE 4-2
FLOW DISTURBANCE RESULTS
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Unit 1 3D Probe	Unit 2 3D Probe
Avg. Yaw Angle, degrees	2.0	4.4
Avg. Pitch Angle, degrees	-0.4	-1.0
Avg. Resultant Angle, degrees	5.6	5.9
Standard Deviation, degrees	3.3	4.0

APPENDIX A
MEASUREMENT PROCEDURES

Continuous Emissions Monitoring System

Oxygen (O_2) by Continuous Analyzer

Three-Dimensional Velocity Testing

Continuous Emissions Monitoring System

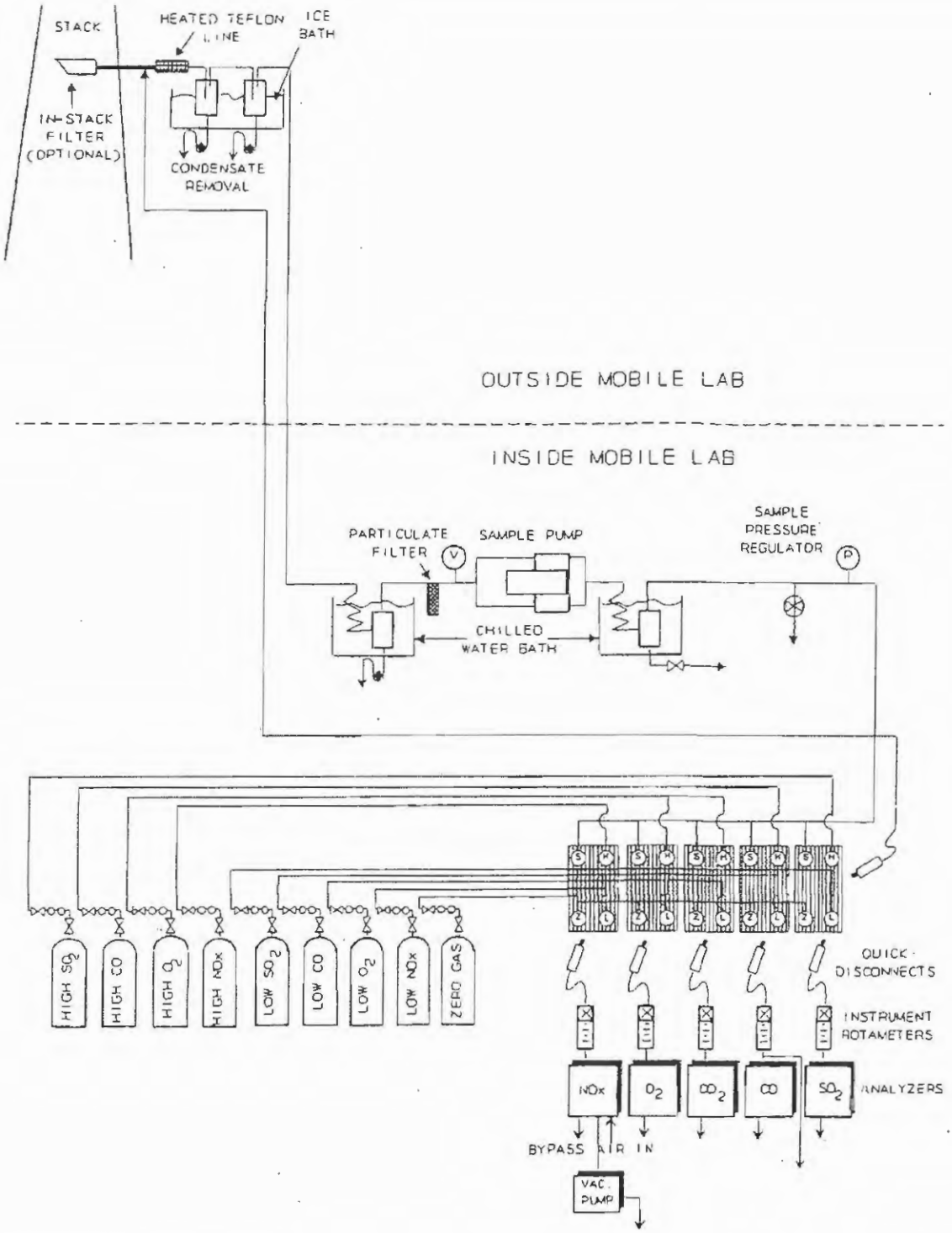
O_2, CO, CO_2, NO, NO_x and SO_2 are measured using an extractive continuous emissions monitoring (CEM) package, shown in the following figure. This package is comprised of three basic subsystems. They are: (1) the sample acquisition and conditioning system, (2) the calibration gas system, and (3) the analyzers themselves. This section presents a description of the sampling and calibration systems. Descriptions of the analyzers used in this program and the corresponding reference test methods follow. Information regarding quality assurance information on the system, including calibration routines and system performance data follows.

The sample acquisition and conditioning system contains components to extract a representative sample from the stack or flue, transport the sample to the analyzers, and remove moisture and particulate material from the sample. In addition to performing the tasks above, the system must preserve the measured species and deliver the sample for analysis intact. The sample acquisition system extracts the sample through a stainless steel probe. The probe is insulated or heated as necessary to avoid condensation. If the particulate loading in the stack is high, a sintered stainless steel filter is used on the end of the probe.

Where water soluble NO_2 and/or SO_2 are to be measured, the sample is drawn from the probe through a heated teflon sample line into an on-stack cooled (approximately 35-40°F) water removal trap. The trap consists of stainless steel flasks in a bath of ice and water. This design removes the water vapor by condensation. The contact between the sample and liquid water is minimized and the soluble NO_2 and SO_2 are conserved. This system meets the requirements of EPA Method 20. The sample is then drawn through a teflon transport line, particulate filter, secondary water removal and into the sample pump. The pump is a dual head, diaphragm pump. All sample-wetted components of the pump are stainless steel or teflon. The pressurized sample leaving the pump flows through a third condensate trap in a refrigerated water bath (≈38°F) for final moisture removal. A drain line and valve are provided to constantly expel any condensed moisture from the dryer at this point. After the dryer, the sample is directed into a distribution manifold. Excess sample is vented through a back-pressure regulator, maintaining a constant pressure of 5-6 psig to the analyzer rotameters.

The calibration system is comprised of two parts: the analyzer calibration, and the system bias check (dynamic calibration). The analyzer calibration equipment includes pressurized cylinders of certified span gas. The gases used are, as a minimum, certified to 1% by the manufacturer. Where necessary to comply with reference method requirements EPA Protocol 1 gases are used. The cylinders are equipped with pressure regulators which supply the calibration gas to the analyzers at the same pressure and flow rate as the sample. The selection of zero, span, or sample gas directed to each analyzer is accomplished by operation of the sample/calibration selector fittings.

The system bias check is accomplished by transporting the same gases used to zero and span the analyzers to the sample system as close as practical to the probe inlet. This is done either by attaching the calibration gas supply line to the probe top with flexible tubing or by actuation of a solenoid valve located at the sample conditioner inlet (probe exit). The span gas is exposed to the same elements as the sample and the system response is documented. The analyzer indications for the system calibration check must agree within 5% of the analyzer calibration. Values are adjusted and changes/repairs are made to the system to compensate for any difference in analyzer readings. Specific information on the analytical equipment and test methods used is provided in the following pages.



Schematic of CEM System

Method:	Oxygen (O_2) by Continuous Analyzer
Applicable Reference Methods:	EPA 3A, EPA 20, ARB 100, BA ST-14, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned, and conveyed to the instrument for direct readout of O_2 concentration.
Analyzer:	Teledyne Model 326A
Measurement Principle:	Electrochemical cell
Ranges:	0-5, 0-10, 0-25 % O_2
Accuracy:	1 % of full scale
Output:	0-100 mV, linear
Interferences:	Halogens and halogenated compounds will cause a positive interference. Acid gases will consume the fuel cell and cause a slow calibration drift.
Response Time:	90% < 7 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If Method 20 is used, that method's specific procedures for selecting sample points are used. Otherwise, stratification checks are performed at the start of a test program to select single or multiple-point sample locations.
Analytical Procedure:	An electrochemical cell is used to measure O_2 concentration. Oxygen in the flue gas diffuses through a Teflon membrane and is reduced on the surface of the cathode. A corresponding oxidation occurs at the anode internally, and an electric current is produced that is proportional to the concentration of oxygen. This current is measured and conditioned by the instrument's electronic circuitry to give an output in percent O_2 by volume.
Special Calibration Procedure:	The measurement cells used with the O_2 instrument have to be replaced on a regular basis. After extended use, the cell tend to produce a nonlinear response. Therefore, a three-point calibration is performed at the start of each test day to check for linearity. If the response is not linear ($\pm$ 2% of scale), the cell is replaced.

Method:	Three-Dimensional Velocity Testing
Applicable Ref. Method:	EPA Method 1, ANSI ASME PTC 11 - 1984
Applicability of Method:	When a sample location to be used for velocity or particulate tests does not meet the traditional Method 1 criteria of being at least two duct diameters downstream and one-half diameter upstream of any flow disturbance, this alternate method is used to evaluate the suitability of the location. A three-dimensional velocity probe is used to measure pitch and yaw angle at a minimum of 40 traverse points for round ducts and 42 points for rectangular ducts. If the average resultant angle is less than 20° and the standard deviation is less than 10°, the sample location is deemed acceptable. Velocity and particulate traverses are then performed at the same traverse points using standard Method 2 and 5 equipment and procedures.
Principle:	The instrument measures yaw and pitch angles of fluid flow, as well as total and static pressures.
Analyzer:	United Sensor Three-Dimensional Directional Probe
Sampling Procedure:	Each probe has five measuring holes in its tip. A centrally located pressure hole measures pressure P1, while two lateral pressure holes measure pressures P2 and P3. If the probe is rotated manually until P2 and P3 are identical as a readout on the manometer, the yaw angle of flow is then indicated by the number of degrees rotated. When the yaw angle has been determined, an additional differential pressure P4 - P5 is measured by pressure holes located above and below the total pressure (P1) hole. Pitch angle is determined by calculating (P4 - P5)/(P1 - P2) and using the calibration data for the individual probe and interpolating between the bracketing data. At any particular pitch angle, the velocity pressure coefficient (Pt - Ps)/(P1 -P2) can also be interpolated from the calibration data and Pt - Ps and Ps calculated. Note that this probe also allows for very accurate gas flow measurements, in addition to the EPA Method 1 procedures that allow it to be used for determination of flow angle.

Definitions:

P_1 = Total Pressure
P_2 = Static Pressure
P_3 = Static Pressure
P_4 = Pitch Pressure
P_5 = Pitch Pressure

$P_1 - P_2$ = Velocity Head Pressure

$\frac{P_4 - P_5}{P_1 - P_2}$ = Pitch angle calculated on calibration curve

Calculations:

Velocity (fps) in direction of flow

$$V_s = 2.90\ C_P \sqrt{\Delta P\ T_s}\ \sqrt{\left(\frac{29.92}{P_S}\right)\left(\frac{28.95}{MW_{wet}}\right)}$$

where:
C_P = Pitot Calibration factor
ΔP = Average velocity, head, iwg $(\overline{\sqrt{\Delta P}})^2$
T_S = Stack Temperature, °R
P_S = Stack Pressure (iwg)
MW_{wet} = Molecular weight, wet

Resultant angle:

$$R = \left| \frac{\cos^{-1}\left(\cos\phi_{Y,R}\ \cos\phi_{P,R}\right)}{0.0175} \right|$$

where:
$\phi_{Y,R}$ = Yaw Angle in Radians
$\phi_{P,R}$ = Pitch Angle in Radians
R = Resultant Angle in Degrees

Pitch Angle Curve Fit Equation (Degrees)

$$\phi_P = A_1\left(\frac{P_4-P_5}{P_1-P_2}\right) + A_2\left(\frac{P_4-P_5}{P_1-P_2}\right)^2 - A_3\left(\frac{P_4-P_5}{P_1-P_2}\right)^3 - A_4\left(\frac{P_4-P_5}{P_1-P_2}\right)^4 + A_5\left(\frac{P_4-P_3}{P_1-P_2}\right)^5 + A_6\left(\frac{P_4-P_5}{P_1-P_2}\right)^6$$

Pitot coefficient curve fit equation (used to calculate corrected axial velocities)

$$\frac{P_t-P_s}{P_1-P_2} = B_1 + B_2\,\phi_P + B_3 + \phi_P + B_4\,\phi_P^3 + B_5\,\phi_P^4 + B_6\ \phi_P^5 + B_7\,\phi_P^6$$

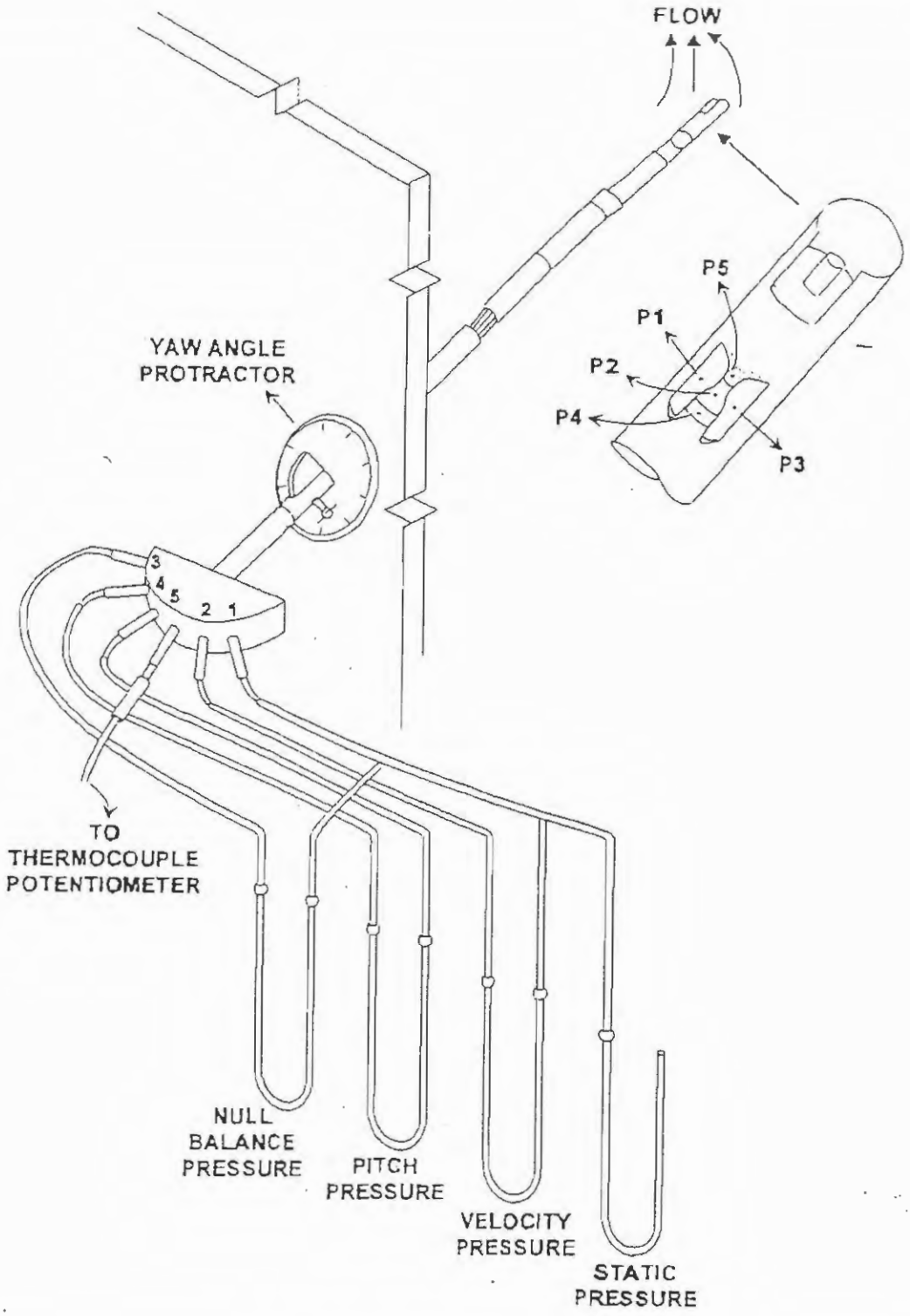


Figure Five Hole Probe

3-DIMENSIONAL VELOCITY PROBE CALIBRATION FACTORS

Probe	B-2455
A_1	63.09
A_2	23.69
A_3	24.505
A_4	33.312
A_5	7.5203
A_6	11.669
B_1	0.997
B_2	7×10^{-3}
B_3	3×10^{-5}
B_4	8×10^{-7}
B_5	1×10^{-9}
B_6	3×10^{-10}
B_7	3×10^{-2}

APPENDIX B
QUALITY ASSURANCE

Appendix B.1

Quality Assurance Program Summary

QUALITY ASSURANCE PROGRAM SUMMARY AND ARB CERTIFICATION

Carnot ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by an internal QA Officer and encompasses seven major areas:

1. Development and use of an internal QA manual.
2. QA reviews of reports, laboratory work, and field testing.
3. Equipment calibration and maintenance.
4. Chain of custody.
5. Training.
6. Knowledge of current test methods.
7. Agency certification.

Each of these areas is discussed individually below.

Quality Assurance Manual. Carnot has prepared a QA Manual according to EPA guidelines. The manual serves to document and formalize all of Carnot's QA efforts. The manual is constantly updated, and each member of the Source Test Division is required to read and understand its contents. The manual includes details on the other six QA areas discussed below.

QA Reviews. Carnot's review procedure includes review of each source test report by the QA Officer, and spot check reviews of laboratory and field work.

The most important review is the one that takes place before a test program begins. The QA Officer works closely with Source Test Division personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of any interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternate procedures.

Equipment Calibration and Maintenance. The equipment used to conduct the emissions measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined by the California Air Resources Board (CARB). The schedule for maintenance and calibrations are given in Tables B-1 and B-2. Quality control checks are also conducted in the field for each test program. The following is a partial list of checks made as part of each CEM system test series.

- Sample acquisition and conditioning system leak check.
- 2-point analyzer calibrations (all analyzers)
- 3-point analyzer calibrations (analyzers with potential for linearity errors).
- Complete system calibration check ("dynamic calibration" through entire sample system).

- Periodic analyzer calibration checks (once per hour) are conducted at the start and end of each test run. Any change between pre- and post-test readings are recorded.

- All calibrations are conducted using gases certified by the manufacturer to be + 1% of label value (NBS traceable).

Calibration and CEM performance data are fully documented, and are included in each source test report.

Chain of Custody. Carnot maintains full chain of custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, Carnot documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.).

Samples are stored in a locked area to which only Source Test Division personnel have access. Neither other Carnot employees nor cleaning crews have keys to this area.

Data sheets are copied immediately upon return from the field, and this first generation copy is placed in locked storage. Any notes made on original sheets are initialed and dated.

Training. Personnel training is essential to ensure quality testing. Carnot has formal and informal training programs which include:

1. Attendance at EPA-sponsored training courses.
2. Enrollment in EPA correspondence courses.
3. A requirement for all technicians to read and understand Carnot's QA Manual.
4. In-house training and QA meetings on a regular basis.
5. Maintenance of training records.

Knowledge of Current Test Methods. With the constant updating of standard test methods and the wide variety of emerging test methods, it is essential that any qualified source tester keep abreast of new developments. Carnot subscribes to services which provide updates on EPA and CARB reference methods, and on EPA, CARB and SCAQMD rules and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences. Carnot personnel maintain membership in the Air and Waste Management Association, the Source Evaluation Society, and the ASME Environmental Control Division.

AGENCY CERTIFICATION

Carnot is certified by the CARB as an independent source test contractor for gaseous and particulate measurements. Carnot is certified by the SCAQMD as an independent source test contractor for gaseous and particulate measurements using SCAQMD Methods 1, 2, 3, 4, 5, 6, 7 and 100.1. Carnot also participates in EPA QA audit programs for Methods 5, 6 and 7.

TABLE B-1
SAMPLING INSTRUMENTS AND EQUIPMENT CALIBRATION SCHEDULE
As Specified by the CARB

Instrument Type	Frequency of Calibration	Standard of Comparison or Method of Calibration	Acceptance Limits
Orifice Meter (large)	12 months	Calibrated dry test meter	± 2% of volume measured
Dry Gas Meter	12 months or when repaired	Calibrated dry test meter	± 2% of volume measured
S-Type Pitot (for use with EPA-type sampling train	6 months	EPA Method 2	Cp constant (+5%) over working range; difference between average Cp for each leg must be less than 2%
Vacuum Gauges Pressure Gauges	6 months	Manometer	± 3%
Field Barometer	6 months	Mercury barometer	± 0.2" Hg
Temperature Measurement	6 months	NBS mercury thermometer or NBS calibrated platinum RTD	± 4°F for <400°F ± 1.5% for >400°F
Temperature Readout Devices	6 months	Precision potentiometer	± 2% full scale reading
Analytical Balance	12 months (check prior to each use)	Should be performed by manufacturer or qualified laboratory	± 0.3 mg of stated weight
Probe Nozzles	12 Months	Nozzle diameter check micrometer	Range < ± 0.10 mm for three measurements
Continuous Analyzers	Depends upon use, frequency and performance	As specified by manufacturers operating manuals, EPA NBS gases and/or reference methods	Satisfy all limits specified in operating specifications

TABLE B-2
EQUIPMENT MAINTENANCE SCHEDULE
Based on Manufacturer's Specifications and Carnot Experience

Equipment	Performance Requirement	Maintenance Interval	Corrective Action
Pumps	1. Absence of leaks 2. Ability to draw manufacturer required vacuum and flow	Every 500 hours of operation or 6 months, whichever is less	1. Visual inspection 2. Clean 3. Replace worn parts 4. Leak check
Flow Measuring Device	1. Free mechanical movement 2. Absence of malfunction	Every 500 hours of operation or 6 months, whichever is less After each test, if used in H_2S sampling or other corrosive atmospheres	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero, span gas	As required by the manufacturer	As recommended by manufacturer
Integrated Sampling Tanks	Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobile Van Sampling Systems	Absence of leaks	Depends on nature of use	1. Change filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling Lines	Sample degradation less than 2%	After each test or test series	Blow filtered air through line until dry

Appendix B.2

ARB Certification

State of California
AIR RESOURCES BOARD

Executive Order G-94-028

Approval to Carnot
To Conduct Testing as an Independent Contractor

WHEREAS, the Air Resources Board (ARB), pursuant to Section 41512 of the California Health and Safety Code, has established the procedures contained in Section 91200-91220, Title 17, California Code of Regulations, to allow the use of independent testers for compliance tests required by the ARB; and

WHEREAS, pursuant to Sections 91200-91220, Title 17, California Code of Regulations, the Executive Officer has determined that Carnot meets the requirements of the ARB for conducting ARB Test Methods 1, 2, 3, 4, 5, 6, 8, 10, and 100 (NOx, O2) when the following conditions are met:

1. Carnot conducts ARB Test Method 100 for O2 using a Teledyne 326 analyzer with either a A5 or a B1 sensor, or a paramagnetic analyzer.

NOW, THEREFORE, BE IT ORDERED that Carnot is granted an approval, from the date of execution of this order, until June 30, 1995 to conduct the tests listed above, subject to compliance with Section 91200-91220, Title 17, California Code of Regulations.

BE IT FURTHER ORDERED that during the approved period the Executive Officer or his or her authorized representative may field audit one or more tests conducted pursuant to this order for each type of testing listed above.

Executed this 29TH day of JUNE 1994, at Sacramento, California.

James J. Morgester, Chief
Compliance Division

STATE OF CALIFORNIA
AIR RESOURCES BOARD
2020 L STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

PETE WILSON, Governor

July 8, 1994

Mr. Michael L. Schmitt
Carnot
15991 Red Hill Avenue, Suite 110
Tustin, California 92680

Dear Mr. Schmitt:

Testing Approval

We are pleased to inform you that we have renewed your approval to conduct the types of testing listed in the enclosed Executive Order. This approval is valid until June 30, 1995 during which time a field audit of your company's testing ability may be conducted. We have also enclosed a certificate of approval.

Should you have any questions or need further assistance, please contact Ms. Kathryn Gugeler at (916) 327-1521 or Mr. David Tribble at (916) 323-2217. All correspondence should be addressed to me at the post office box above.

Sincerely,

James J. Morgester, Chief
Compliance Division

Enclosures

cc: Mr. Ed Jeung
Department of Health Services
Air and Industrial Hygiene Laboratory
2151 Berkeley Way
Berkeley, California 94704

State of California

Air Resources Board

Approved Independent Contractor

Carnot

This is to certify that the company listed above has been approved by the Air Resources Board to conduct compliance testing pursuant to Section 91207, Title 17, California Code of Regulations, until June 30, 1995, for those test methods listed below:

ARB Source Test Methods:
1, 2, 3, 4, 5, 6, 8, 10, 100(NOx, O2)

James J. Morgester, Chief
Compliance Division

Laura McKinney, Manager
Certification and Investigation Section

Appendix B.3

Calibration Data

CARNOT
SPAN GAS RECORD

CLIENT/LOCATION: UCOS - Colmac DATE: 6/27/96

BY: CS

GAS	SPAN CYLINDER		AUX. SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO		99.999 %		
NOx	AAL3583	88.54	AAL1240 J	47.51
O_2	ALM-045927	8.937	ALM05-739	12.45
CO				
CO_2	ALM 045927	22.43	ALM05739	15.16
SO_2				

CARNOT
INSTRUMENT LINEARITY

	ANALYZER				
	O_2	CO_2	CO	NOx	SO_2
ANALYZER RANGE	0-25	—	—	0-100	—
SET TO HIGH STD (80-90% OF RANGE)	20.9	—	—	88.5	—
ACTUAL VALUE OF LOW STD	12.45	—	—	47.51	—
AS-FOUND LOW STD (50-60% OF RANGE)	12.33	—	—	48.9	—
DIFFERENCE IN % OF FULL SCALE	0.5	—	—	+1.3	—

% ERROR CALCULATION:

$$\frac{(\text{AS FOUND} - \text{ACTUAL VALUE OF SPAN})}{\text{RANGE}} \times 100$$

ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIP CHART).

CARNOT

PMF-009

CARNOT
SPAN GAS RECORD

CLIENT/LOCATION: UCOS Colmac DATE: 6-28-94

BY: D. W.

GAS	SPAN CYLINDER		AUX. SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO				
NOx	AAL3583	88.54	AAL12400	47.51
O_2	ALM-045927	8.937	ALM-739	12.45
CO				
CO_2				
SO_2				

CARNOT
INSTRUMENT LINEARITY

	ANALYZER				
	O_2	CO_2	CO	NOx	SO_2
ANALYZER RANGE	0-25			0-100	
SET TO HIGH STD (80-90% OF RANGE)	20.74			88.5	
ACTUAL VALUE OF LOW STD	12.45			47.51	
AS-FOUND LOW STD (50-60% OF RANGE)	12.55			47.00	
DIFFERENCE IN % OF FULL SCALE	.5%			.5%	

% ERROR CALCULATION:

$$\frac{(\text{AS FOUND} - \text{ACTUAL VALUE OF SPAN})}{\text{RANGE}} \times 100$$

ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIP CHART).

CARNOT

PMF-009

CARNOT
CEM PERFORMANCE DATA

CLIENT/LOCATION: UCOS-Colma DATE: 6/28/94

BY: GS

SYSTEM CONFIGURATION F600

ANALYZERS IN SERVICE				
ANALYZERS:	O_2	CO_2	CO	NOx
MODEL:	Teledyne	PIR 2000	48	10S
SERIAL NO.:				

PROBE	MAIN	HRK
LENGTH:	6'	4'
LINER MATERIAL:	SS	SS
HEATED PROBE (Y/N):	NO	NO
HEATED LINE (Y/N):	Yes	Yes

SAMPLE CONDITIONER	
CONDENSER-VACUUM SIDE (CHECK FLOW):	✓
CONDENSER-PRESSURE SIDE (CHECK FLOW):	✓
CONDENSER TEMPERATURE:	40
FILTER CONDITION (COND. OR DATE LAST CHANGED):	5D 4/94

SAMPLE LINE	
LENGTH:	50'
LINER MATERIAL:	teflon
SYSTEM BIAS LINE:	teflon

SYSTEM LEAK CHECK	MAIN	HRK
PRE-TEST (cfh):	0.0	0.0
POST-TEST (cfh):		

LEAK RATE (%) = $\frac{\text{POST-TEST (cfh)}}{\text{SYSTEM FLOW RATE (cfm) x 60}}$ x 100 = _____ %

ON-STACK CONDITIONER	
IN SERVICE (Y/N):	Yes
KNOCK-OUT CONDITION (CHECK FLOW):	✓
COOLANT:	ICE

NOx CONVERSION EFFICIENCY	
HIGH CAL NOx	
HIGH CAL NO (AS FOUND)	/
LOW CAL NOx	
LOW CAL NO (AS FOUND)	/

OPERATING CONDITIONS	
SAMPLE PRESSURE:	SYSTEM RESPONSE TIME CHECK
SAMPLE VACUUM:	UPSCALE: _____ sec.
NOx VACUUM:	DOWNSCALE: _____ sec.

PMF-011

CARNOT

Scott Specialty Gases, Inc.

2600 CAJON BOULEVARD, SAN BERNARDINO, CA 92411 (909) 887-2571 FAX: (909) 887-0549

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
CARNOT
RICK MADRIGAL
15991 RED HILL AVE
TUSTIN, CA 92680

Assay Laboratory
Scott Specialty Gases
2600 Cajon Boulevard
San Bernardino, CA 92411

Purchase Order 1818
Project # 30380 003

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September 1993.

Cylinder Number ALM045739 Certification Date 03-15-94 Exp. Date 03-15-97
Cylinder Pressure+ 2000 PSIG

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
(CARBON DIOXIDE)	15.16 %	± 1 % NIST Traceable
(OXYGEN)	12.45 %	
(Nitrogen)	Balance Gas	

+Do not use when cylinder pressure is below 150 psig.
*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type/Sample No.	Expiration Date	Cylinder Number	Concentration
GMIS	06-94	A018082	18.97 % CO2 IN N2
GMIS	06-94	A6513	12.45 % O2 IN N2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO2:Horiba / OPE-135C / 56553902	02-22-94	NDIR
O2:Horiba / OPE-335 / 850557042	02-25-94	Magnetopneumatic

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Carbon Dioxide

First Triad Analysis
Date: 03-15-94 Response Units: mv
Z1= 0.00 R1= 97.0 T1= 85.9
R2= 97.0 Z2= 0.00 T2= 85.8
Z3= 0.00 T3= 85.8 R3= 97.0
Avg. Conc. of Cust Cyl. 15.16 %

Second Triad Analysis
Date: Response Units: mv
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Conc. of Cust Cyl.

Calibration Curve
Concentration= Ax^3+Bx^2+Cx+D
A =0.000007988
B =0.0002062
C =0.1000
D =-0.0001333

Oxygen

First Triad Analysis
Date: 03-15-94 Response Units: mv
Z1= 0.00 R1= 94.1 T1= 49.8
R2= 94.1 Z2= 0.00 T2= 49.8
Z3= 0.00 T3= 49.8 R3= 94.1
Avg. Conc. of Cust Cyl. 12.45 %

Second Triad Analysis
Date: Response Units: mv
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Conc. of Cust Cyl.

Calibration Curve
Concentration= Ax + B
A =0.2500
B =-0.004586

Date: Response Units: mv
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Conc. of Cust Cyl.

Date: Response Units: mv
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Conc. of Cust Cyl.

Concentration=

Special Notes:

ANALYST

Scott Specialty Gases, Inc.

2600 CAJON BOULEVARD, SAN BERNARDINO, CA 92411 (909) 887-2571 FAX (909) 887-0549

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
CARNOT
RICK MADRIGAL
15991 RED HILL AVE
SUITE 110
TUSTIN, CA 92680

Assay Laboratory
Scott Specialty Gases
2600 Cajon Boulevard
San Bernardino, CA 92411

Purchase Order 1914
Project # 30667 009

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, Procedure G1, September 1993.

Cylinder Number ALM045927 Certification Date 03-30-94 Exp. Date 03-30-97
Cylinder Pressure+ 1900 PSIG

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
(CARBON DIOXIDE)	22.43 %	± 1 % NIST Traceable
(OXYGEN)	8.937 %	
(Nitrogen)	Balance Gas	

+Do not use when cylinder pressure is below 150 psig.
*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type/Sample No.	Expiration Date	Cylinder Number	Concentration
CRM1675	06-94	ALM001136	14.08 % CO2/N2
GMIS	06-94	A10868	9.520 % O2/N2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO2:PIR2000-ACUBLEND	03-24-94	NDIR
O2:Horiba / OPE-335 / 850557042	03-30-94	Magnetopneumatic

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Carbon Dioxide

First Triad Analysis

Date: 03-30-94 Response Units: mv

Z1= 0.00	R1= 72.9	T1= 92.2
R2= 72.9	Z1= 0.00	T2= 92.2
Z3= 0.00	T3= 92.2	R3= 72.9

Avg. Conc. of Cust Cyl. 22.43 %

Second Triad Analysis

Date: Response Units: mv

Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

Avg. Conc. of Cust Cyl.

Calibration Curve

Concentration= $Ax^4+Bx^3+Cx^2+Dx+E$

A =-0.0000001942
B =-0.00001975
C =0.001882
D =0.08535
E =0.002942

Oxygen

First Triad Analysis

Date: 03-30-94 Response Units: mv

Z1= 0.00	R1= 95.3	T1= 89.4
R2= 95.3	Z2= 0.00	T2= 89.4
Z3= 0.00	T3= 89.3	R3= 95.3

Avg. Conc. of Cust Cyl. 8.937 %

Second Triad Analysis

Date: Response Units: mv

Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

Avg. Conc. of Cust Cyl.

Calibration Curve

Concentration= Ax + B

A =0.09999
B =0.0004275

Date: Response Units: mv

Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

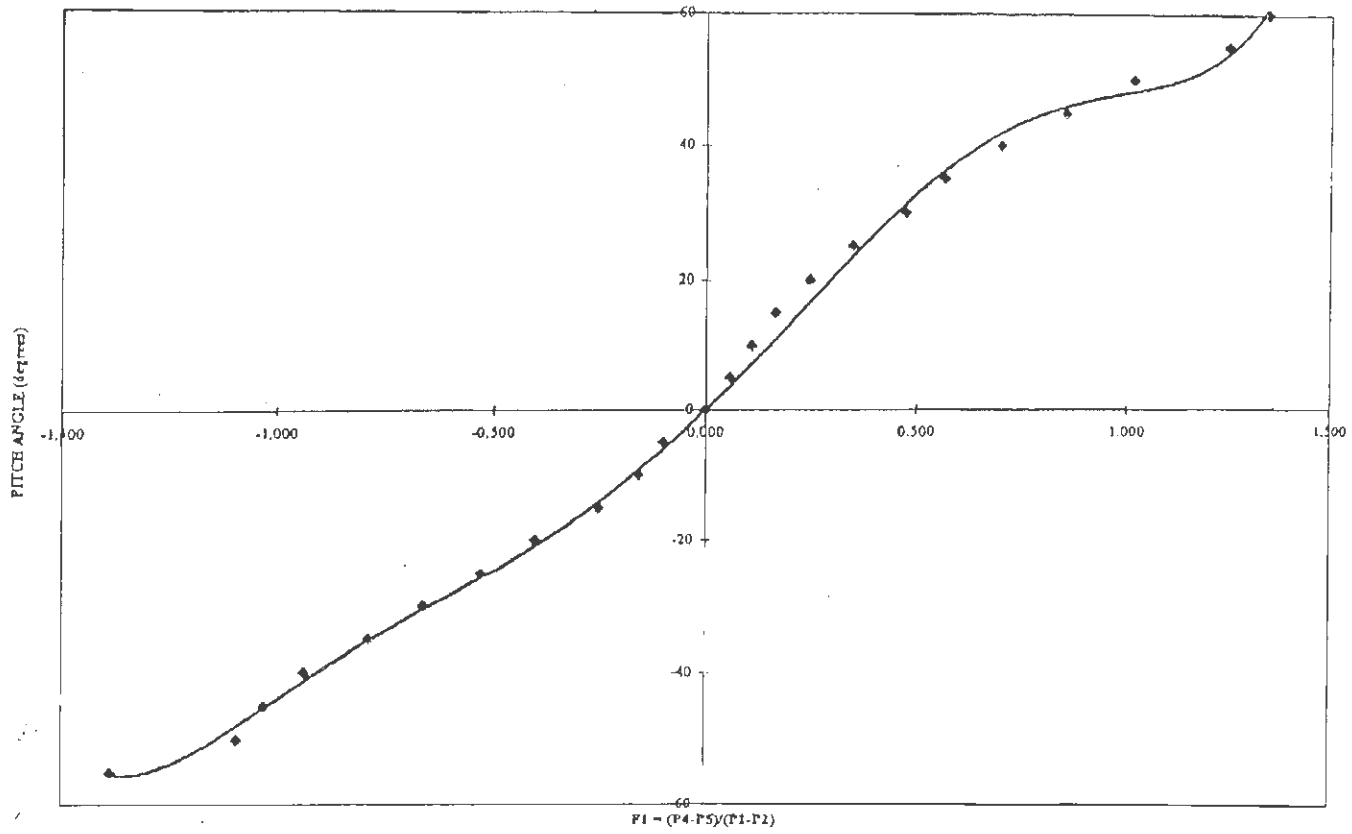
Date: Response Units: mv

Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

Concentration=

Analyst:

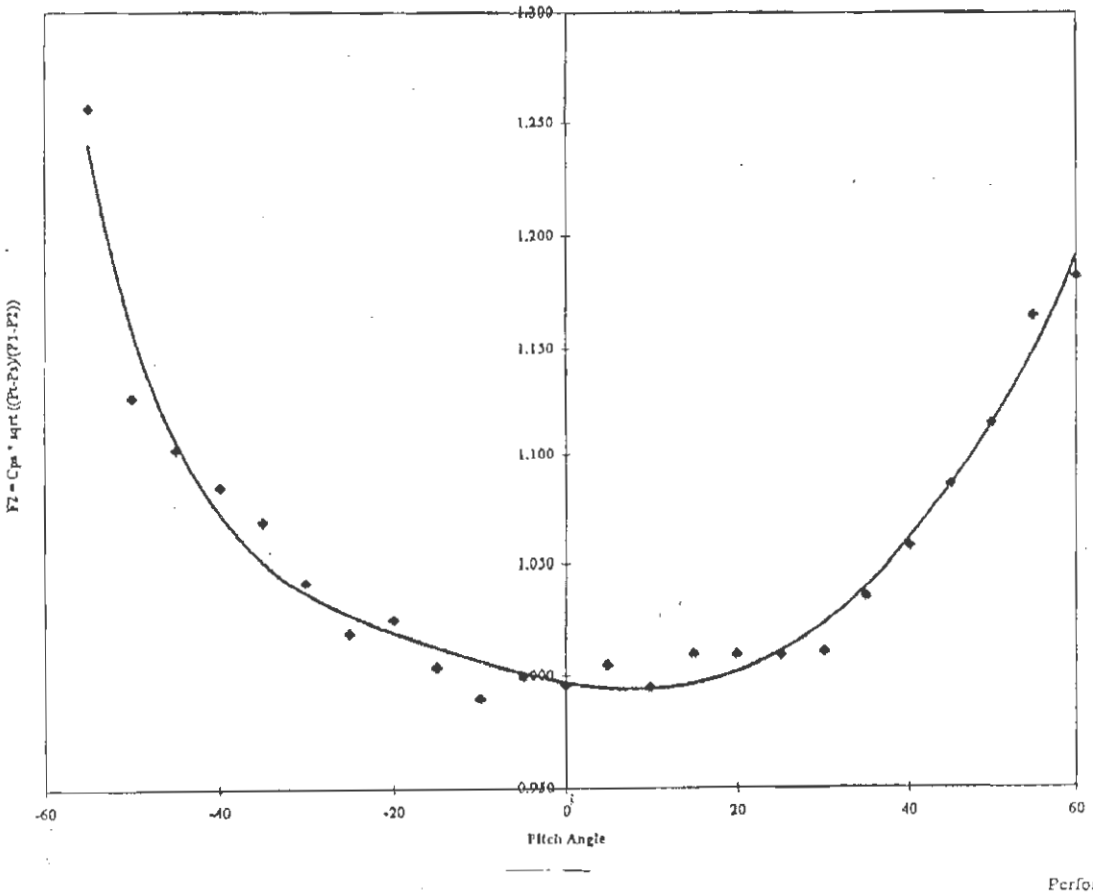
CARNOT
3-DIMENSIONAL VELOCITY PROBE CALIBRATION
PITCH ANGLE vs. F1
PROBE ID: B-2455



Pitch Angle = 63.09X + 23.69X^2 - 24.505X^3 - 33.312X^4 + 7.5203X^5 + 11.669X^6

Performed By: MM/RM
Date: 6/13/94

CARNOT
3-DIMENSIONAL VELOCITY PROBE CALIBRATION
F2 vs. PITCH ANGLE
PROBE ID: B-2455



$F2 = 0.997 - 0.0007X + 3E\text{-}5X^2 + 8E\text{-}7X^3 + 1E\text{-}8X^4 - 3E\text{-}10X^5 + 3E\text{-}12X^6$

Performed By: MM/RM
Date: 5/18/94

APPENDIX C
DATA SHEETS

Appendix C.1

Sample Locations

CARNOT

SAMPLING POINT LOCATION DATA - EPA METHOD 1

PLANT: Ucets - Colmac DATA BY: EF

DATE: 6/27/94

TEST LOCATION: Unit 2 Duct

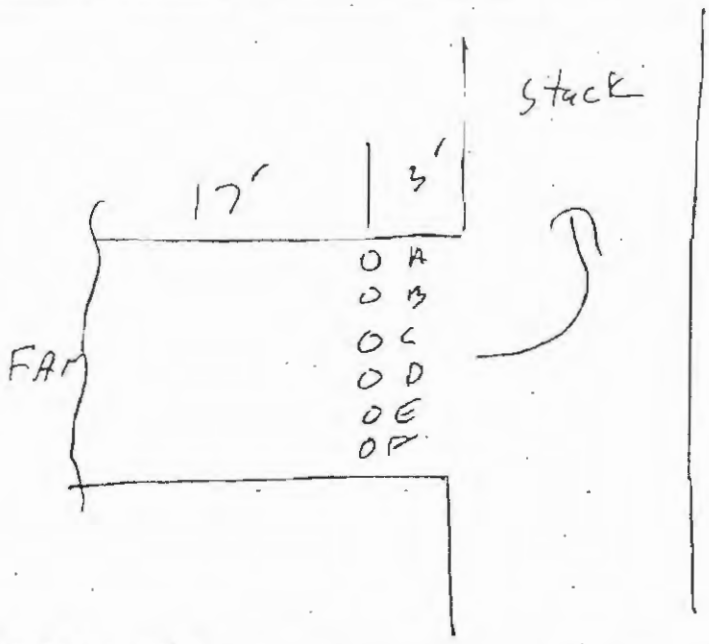


Diagram of Sampling Location

UPSTREAM DIST./DIA.: 17/

DOWNSTREAM DIST./DIA.: 3/

COUPLING LENGTH: 8"

NO. OF SAMPLING PTS.: 42

STACK DIMENSION: 47" x 119"

STACK AREA, FT²: 38.8

*INCHES FROM WALL PLUS COUPLING LENGTH

SAMPLE POINT	% OF DIAMETER	IN. FROM NEAR WALL	IN. FROM NOZZLE*
1		3.4	11.42
2		10.3	18.3
3		17.14	25.14
4		24.	32
5		30.86	38.86
6		37.7	45.71
7		44.5	52.57

CARNOT

PMF-002

Appendix C.2

CEM Data

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UCOS - Colmac
DATE: 6/28/94 - ET
OPERATOR:
TEST LOCATION: Unit 1 Outlet
TEST NUMBERS: 1-1 Strat

AMBIENT TEMP., DB/WB: ~115
BAROMETRIC PRESSURE: 29.80
DUCT STATIC PRESSURE: -0.7
FUEL: Bo Mass

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ___% ___, DRY		
			O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
		20% Span	.3/1.22	1/1.24								
1-1	1218/1221	A5	6.9	6.9								
	1221/1224	A4	7.2	7.1								
	1224/1227	A3	6.7	6.7								
	1227/1230	A2	7.0	7.2								
	1230/1233	A1	7.1	8.0								
	1236/1239	B5	6.5	6.5								
	1239/1242	B4	6.7	6.7								
	1242/1245	B3	6.9	6.6								
	1245/1248	B2	6.3	6.2								
	1248/1251	B1	6.5	6.5								

COMMENTS:

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: VCU5 - Column
DATE: 6/28/14
OPERATOR: EP
TEST LOCATION: Unit 1
TEST NUMBERS: 1-1 - Start

AMBIENT TEMP., DB/WB:
BAROMETRIC PRESSURE:
DUCT STATIC PRESSURE:
FUEL: Bio Mass

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	Ref = DRY, UNCORRECTED							CORRECTED TO ___% ___, DRY		
			O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
	1254/1257	C5	6.6	6.5								
	1257/1300	C4	6.3	6.2								
	1300/1303	C3	6.4	6.4								
	1305/1306	C2	6.9	6.8								
	1306/1309	C1	6.7	6.7								
	1312/1315	D5	6.7	6.6								
	1315/1318	D4	6.9	6.8								
	1318/1321	D3	6.7	6.7								
	1321/1324	D2	6.6	6.6								
	1324/1327	D1	6.7	6.7								

COMMENTS:

CARNOT

PMF-013

(5)

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: WMS - Colmac
DATE: 6/28/94
OPERATOR: SG
TEST LOCATION: Unit 2 Outlet
TEST NUMBERS: 1-1 - Straw

AMBIENT TEMP., DB/WB:
BAROMETRIC PRESSURE:
DUCT STATIC PRESSURE:
FUEL:

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ___% ___, DRY		
			Rob O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
1-1	1330 / 1333	E-5	7.0	6.9								
	1337 / 1330	E-4	6.6	6.6								
	1336 / 1339	E-3	6.6	6.6								
	1334 / 1342	E-2	6.9	6.8								
	1342 / 1345	E-1	6.7	6.6								
	1348 / 1351	F-5	6.5	6.5								
	1351 / 1354	F-4	6.2	6.2								
	1354 / 1357	F-3	6.8	6.8								
	1357 / 1400	F-2	6.8	6.8								
	1400 / 1403	F-1	6.8	6.8								
	1400 / 1409	A-1	6.5	6.5								
	SYS	Zero / SPAN	.3 / 12.1	.1 / 12.1								

COMMENTS:

CARNOT

PMF-013

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UCOS- Colmac

DATE: 6/28/94

OPERATOR: EF

TEST LOCATION: 2-2-CEM

TEST NUMBERS:

AMBIENT TEMP., DB/WB:

BAROMETRIC PRESSURE:

DUCT STATIC PRESSURE:

FUEL:

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ____% ____, DRY		
			O_2 REF	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
	SYS	Zero / SPAN	.3/12.2	.1/12.4								
	933 / 936	F5	7.0	7.0								
	936 / 939	F4	6.4	6.5								
	939 / 942	F3	7.3	7.4								
	942 / 945	F2	7.0	7.0								
	945 / 948	F1	6.7	6.7								
	951 / 954	B5	6.5	6.5								
	954 / 957	E-4	6.7	6.8								
	957 / 1000	E-3	7.1	7.1								
	1000 / 1003	E-2	6.9	7.0								
	1003 / 1006	E-1	6.7	6.8								

COMMENTS:

CARNOT

PMF-013

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UCOS - Colmac

DATE: 6/28/94

OPERATOR: EC

TEST LOCATION:

TEST NUMBERS:

AMBIENT TEMP., DB/WB:

BAROMETRIC PRESSURE:

DUCT STATIC PRESSURE:

FUEL:

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ___% ___, DRY		
			O_2	O_2 Ref	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
2-2	1009/1012	D-5	6.9	7.0								
	1043/1045	D-4	6.3	6.4								
	1015/1018	D-3	7.2	7.2								
	1018/1021	D-2	7.7	7.7								
	1021/1024	D-1	7.0	7.0								
	1033/1036	C-5	6.5	6.4								
	1036/1039	C-4	6.6	6.6								
	1039/1042	C-3	6.5	6.6								
	1042/1045	C-2	6.4	6.4								
	1045/1048	C-1	7.4	7.5								

COMMENTS:

CARNOT

PMF-013

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: VCOS - Columbia
DATE: 6/28/96
OPERATOR: GS
TEST LOCATION: outlet #2
TEST NUMBERS: 2-2-ST

AMBIENT TEMP., DB/WB: 105
BAROMETRIC PRESSURE: 29.92
DUCT STATIC PRESSURE:
FUEL: No Mass

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ___% ___ DRY		
			O_2 Ref	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
	1051/1054	B-5	6.0	6.1								
	1054/1057	B-4	6.2	6.3								
	1057/1100	B-3	6.5	6.6								
	1100/1103	B-2	6.7	6.8								
	1103/1106	B-1	6.6	6.7								
	1109/1112	A-5	7.1	7.3								
	1112/1115	A-4	6.7	6.9								
	1115/1118	A-3	7.4	7.5								
	1118/1121	A-2	6.7	6.8								
	1121/1124	A-1	6.4	6.6								
	GAS	ZERO/SPAN	.3/12.2	.1/12.4								

COMMENTS:

CARNOT

PMF-013

Appendix C.3

3D Flow Data

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: UCOS Colmac

Sample Location: Unit 1 outlet

Unit No: 1

Test No: 1-3-BD-traverse

Barometric Pressure (in Hg):

Static Pressure in Stack (iwg):

Date: 6-28-94

Data Taken By: Dave Woodley

Test Description: 3-D traverse

Pitot I.D. No.:

Pre-Test Leak Check: o.k

Post-Test Leak Check: O.K

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
	D	7	-10	.45	0	413
		6	-6	.47	0	413
		5	-5	.43	+.01	414
1215		4	0	.40	+.01	414
		3	-1	.39	+.01	416
		2	0	.34	+0	416
		1	0	.31	+.01	415
	C	7	-10	.4	-.04	415
	C	6	-10	.35	-.02	416
		5	-5	.37	-.00	416
		4	0	.35	0	417
		3	+5	.41	+.01	417
		2	+8	.4	+.02	417
		1	+10	.33	+.03	417
	B	7	-5	.56	0	416
		6	-10	.57	0	417
		5	-6	.48	0	417
		4	-8	.34	-.02	417
		3	0	.26	+.03	417
		2	+7	.26	+.03	417
		1	+8	.28	+.01	417

Note: Clockwise rotation of the probe corresponds to a positive yaw angle: > 0 or > 90 degrees.

3D_DATA.XLS
2/14/94
8:03 PM

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: UCOS Colmac Date: 6-28

Sample Location: Unit / outlet Data Taken By: Dave W.

Unit No: 1 Test Description: 3-D traverse

Test No: 1-7-3D-traerse Pitot I.D. No.:

Barometric Pressure (in Hg): 29.80 Pre-Test Leak Check:

Static Pressure in Stack (inwg): _____ Post-Test Leak Check: _____

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
	A	7	-10	.59	-.07	415
		6	-8	.48	-.03	416
		5	-6	.48	-.03	418
		4	0	.5	-.05	418
		3	0	.57	-.04	419
		2	0	.6	-.05	419
		1	0	.6	-.07	419
	E	7	~~+5~~	.57	.0	419
		6	-8	.55	0	420
		5	0	.56	0	420
		4	0	.6	0	420
		3	-3	.58	0	420
		2	-2	.6	+.03	420
		1	-2	.58	.02	420
	S	7	-4	.5	-.01	418
		6	0	.6	-.03	418
		5	+2	.55	-.04	419
		4	00	.52	-.04	419
		3	0	.62	-.04	419
		2	0	.62	-.04	419
		1	0	.60	-.03	419

Note: Clockwise rotation of the probe corresponds to a positive yaw angle: > 0 or > 90 degrees.

3D_DATA.XLS
2/14/94
8:03 PM

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: UCCS

Sample Location: Unit 2 outlet

Unit No: 2

Test No: 2-2-3D

Barometric Pressure (in Hg):

Static Pressure in Stack (inwg): -0.75

Date: 8-28-94

Data Taken By: D. W

Test Description: 3-D

Pitot I.D. No.:

Pre-Test Leak Check:

Post-Test Leak Check:

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
1035	A	7	-6	.55	-.05	439
		6	-9	.45	-.05	439
		5	-12	.45	-.05	439
		4	-3	.5	-.05	439
		3	-9	.6	-.04	439
		2	-8	.6	-.05	439
		1	-8	.55	-.00	440
	B	7	+5	.7	-.00	439
		6	-7	.65	0	439
		5	0	.57	0	439
		4	-1	.48	0	439
		3	-2	.72	0	439
		2	-3	.25	0	438
		1	-18	.27	-.02	438
	C	7	0	.41	-.01	437
		6	0	.42	-.02	436
		5	0	.37	-.01	437
		4	-2	.37	+.01	437
		3	-6	.36	+.02	437
		2	-7	.4	+.02	437
		1	-9	.36	+.02	437

Note: Clockwise rotation of the probe corresponds to a positive yaw angle: > 0 or > 90 degrees.

3D_DATA.XLS
2/14/94
8:03 PM

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: VCOS Colmac — Date: 6-27-94

Sample Location: Outlet — Data Taken By: Dave Wonderly

Unit No: 2 — Test Description: 3-D

Test No: 2-2-3D-Vel — Pitot I.D. No.:

Barometric Pressure (in Hg): 29.32 — Pre-Test Leak Check: O.K.

Static Pressure in Stack (inwg): — Post-Test Leak Check: O.K.

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
	F	7	-7°	.55	-.05	
		6	-7°	.57	-.04	446
		5	-7°	.50	-.06	441
		4	-6°	.59	-.03	443
		3	-1	.66	-.03	441
		2	-8°	.60	0	442
		1	-10	.52	+.07	445
	E	7	-9°	.52	0	441
		6	-10°	.52	+.01	442
		5	-5°	.54	+.02	442
		4	-7°	.55	0	442
		3	-3°	.53	0	441
		2	-9°	.53	0	441
		1	-10°	.55	+.02	440
	D	7	0	.49	0	440
		6	+1	.45	+.02	438
		5	-2	.42	+.02	437
		4	0	.39	+.01	437
		3	0	.36	0	437
		2	-3°	.30	-.01	437
		1	-12	.25	0	437

Note: Clockwise rotation of the probe corresponds to a positive yaw angle: > 0 or > 90 degrees.

3D_DATA.XLS
2/14/94
8:03 PM

APPENDIX D
CALCULATIONS

3D VELOCITY - DATA AND WORKSHEET

Client:	UCOS COLMAC	Date:	
Unit:	# 1	Data By:	EF
Sample Location:	Outlet duct	Baro. Pressure, In Hg.:	29.90
Test No.:	1-1-3d	Static Pressure, In WG:	-0.78
Probe ID No.:	B-2131	Abs. Pressure, In Hg.:	29.84
Unit Load:		Average O2, % dry:	6.70
Test Date:	6/28/94	Average CO2, % dry:	12.00
Time (Start/Stop):	0950/1145	Moisture Content, %:	15.00
		Molecular Weight, wet:	28.36

Sample Point		Yaw Angle deg.	Pitch P4-P5 In WG	Total P1-P2 In WG	Stack Temp. F	P4-P5/ P1-P2 In WG	Pitch Angle deg.	Pt-Ps/ P1-P2 In WG	Pt-Ps In WG	Result Angle deg.	Velocity uncorr.* fps	Axial fps
A	7	-10	-0.03	0.58	415	-0.05	-3.2	1.00	0.58	10.5	66.1	65.0
A	6	-8	-0.03	0.48	416	-0.06	-3.8	1.00	0.48	8.9	60.2	59.4
A	5	-6	-0.03	0.48	418	-0.06	-3.8	1.00	0.48	7.1	60.2	59.8
A	4	0	-0.05	0.50	418	-0.10	-6.1	1.00	0.50	6.1	61.5	61.2
A	3	0	-0.04	0.57	419	-0.07	-4.3	1.00	0.57	4.3	65.7	65.5
A	2	0	-0.05	0.60	419	-0.08	-5.1	1.00	0.60	5.1	67.4	67.2
A	1	0	-0.03	0.60	419	-0.05	-3.1	1.00	0.60	3.1	67.4	67.3
E	7	-5	0.00	0.53	419	0.00	0.0	1.00	0.53	5.0	63.2	63.0
E	6	-8	0.00	0.55	420	0.00	0.0	1.00	0.55	8.0	64.4	63.8
E	5	0	0.00	0.56	420	0.00	0.0	1.00	0.56	0.0	65.0	65.0
E	4	0	0.00	0.60	420	0.00	0.0	1.00	0.60	0.0	67.3	67.3
E	3	-3	0.00	0.58	420	0.00	0.0	1.00	0.58	3.0	66.2	66.1
E	2	-2	0.03	0.60	420	0.05	3.2	1.00	0.60	3.8	67.2	67.1
E	1	-2	0.02	0.58	420	0.03	2.2	1.00	0.58	3.0	66.1	66.0
F	7	-4	-0.01	0.50	418	-0.02	-1.3	1.00	0.50	4.2	61.4	61.2
F	6	0	-0.03	0.60	418	-0.05	-3.1	1.00	0.60	3.1	67.3	67.2
F	5	2	-0.04	0.55	419	-0.07	-4.5	1.00	0.55	4.9	64.5	64.3
F	4	0	-0.04	0.52	419	-0.08	-4.7	1.00	0.52	4.7	62.8	62.5
F	3	0	-0.04	0.62	419	-0.06	-4.0	1.00	0.62	4.0	68.5	68.3
F	2	0	-0.04	0.62	419	-0.06	-4.0	1.00	0.62	4.0	68.5	68.3
F	1	0	-0.03	0.60	419	-0.05	-3.1	1.00	0.60	3.1	67.4	67.3
D	7	-10	0.00	0.45	413	0.00	0.0	1.00	0.45	10.0	58.1	57.2
D	6	-6	0.01	0.47	413	0.02	1.4	1.00	0.47	6.2	59.3	59.0
D	5	-5	0.01	0.43	414	0.02	1.5	1.00	0.43	5.2	56.8	56.5
D	4	0	0.01	0.40	414	0.03	1.6	1.00	0.40	1.6	54.7	54.7
D	3	1	0.01	0.39	416	0.03	1.6	1.00	0.39	1.9	54.1	54.1
D	2	0	0.00	0.34	416	0.00	0.0	1.00	0.34	0.0	50.6	50.6
D	1	0	0.01	0.31	415	0.03	2.1	1.00	0.31	2.1	48.2	48.2
C	7	-10	-0.04	0.40	415	-0.10	-6.1	1.00	0.40	11.7	54.9	53.8
C	6	-10	-0.02	0.35	416	-0.06	-3.5	1.00	0.35	10.6	51.4	50.5
C	5	-5	0.00	0.37	416	0.00	0.0	1.00	0.37	5.0	52.7	52.5
C	4	0	0.00	0.35	417	0.00	0.0	1.00	0.35	0.0	51.3	51.3
C	3	5	0.01	0.41	417	0.02	1.6	1.00	0.41	5.2	55.5	55.3
C	2	8	0.02	0.40	417	0.05	3.2	1.00	0.40	8.6	54.8	54.2
C	1	10	0.03	0.33	417	0.09	5.9	0.99	0.33	11.6	49.8	48.7
B	7	-9	0.00	0.58	416	0.00	0.0	1.00	0.58	9.0	66.0	65.2
B	6	-10	0.00	0.57	417	0.00	0.0	1.00	0.57	10.0	65.5	64.5
B	5	-6	0.00	0.48	417	0.00	0.0	1.00	0.48	6.0	60.1	59.8
B	4	-8	0.02	0.34	417	0.06	3.8	0.99	0.34	8.8	50.5	49.9
B	3	0	0.03	0.26	417	0.12	7.6	0.99	0.26	7.6	44.2	43.8
B	2	7	0.03	0.26	417	0.12	7.6	0.99	0.26	10.3	44.2	43.5
B	1	8	0.01	0.28	417	0.04	2.3	1.00	0.28	8.3	45.9	45.4

RESULTS

0.48

Yaw Angle:	2.0 degrees	Stack Temperature:	417 F
Pitch Angle:	-0.4 degrees	Velocity*:	59.45 fps (feet per sec.)
Resultant Angle:	5.6 degrees	Axial Velocity:	59.08 fps
Standard Deviation:	3.3 degrees		

*velocity in the direction of flow

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STRATIFICATION CHECK

Client: UCOS COLMAC
Project #: 1409-40950
Unit No: 1.0
Date: 6/28/94

Point	O_2 pt	Ref O_2	% Diff	Point	O_2 pt	Ref O_2	% Diff
A5	6.9	6.9	0.0%	D5	6.5	6.4	-1.6%
A4	7.2	7.1	-1.4%	D4	6.6	6.6	0.0%
A3	6.7	6.7	0.0%	D3	6.7	6.7	0.0%
A2	7.0	7.2	2.8%	D2	6.6	6.6	0.0%
A1	6.5	6.5	0.0%	D1	6.7	6.7	0.0%
B5	6.5	6.5	0.0%	E5	7.0	6.9	-1.4%
B4	6.7	6.7	0.0%	E4	6.6	6.6	0.0%
B3	6.7	6.6	-1.5%	E3	6.6	6.6	0.0%
B2	6.3	6.2	-1.6%	E2	6.9	6.8	-1.5%
B1	6.5	6.5	0.0%	E1	6.7	6.6	-1.5%
C5	6.6	6.5	-1.5%	F5	6.5	6.5	0.0%
C4	6.3	6.2	-1.6%	F4	6.2	6.2	0.0%
C3	6.4	6.4	0.0%	F3	6.8	6.8	0.0%
C2	6.9	6.8	-1.5%	F2	6.8	6.8	0.0%
C1	6.7	6.7	0.0%	F1	6.8	6.8	0.0%

O2 Stratification= -0.4%

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3D VELOCITY - DATA AND WORKSHEET

Client:	UCOS COLMAC	Date:	
Unit:	# 2	Data By:	EF
Sample Location:	Outlet duct	Baro. Pressure, in Hg.:	29.90
Test No.:	2-2-3d	Static Pressure, in WC:	-0.78
Probe ID No.:	B-2131	Abs. Pressure, in Hg.:	29.84
Unit Load:		Average O2, % dry:	6.70
Test Date:	6/28/94	Average CO2, % dry:	12.00
Time (Start/Stop):	0950/1145	Moisture Content, %:	15.00
		Molecular Weight, wet:	28.36

Sample Point		Yaw Angle deg.	Pitch P4-P5 in WG	Total P1-P2 in WG	Stack Temp. F	P4-P5/ P1-P2 in WG	Pitch Angle deg.	Pt-Ps/ P1-P2 in WG	Pt-Ps in WG	Result Angle deg.	Velocity uncorr.* fps	Axial fps
A	7	-6	-0.05	0.55	439	-0.09	-5.5	1.00	0.55	8.1	65.3	64.6
A	6	-9	-0.05	0.45	439	-0.11	-6.7	1.00	0.45	11.2	59.1	58.0
A	5	-12	-0.05	0.45	439	-0.11	-6.7	1.00	0.45	13.7	59.1	57.4
A	4	-3	-0.05	0.50	439	-0.10	-6.1	1.00	0.50	6.8	62.3	61.8
A	3	-9	-0.04	0.60	439	-0.07	-4.1	1.00	0.60	9.9	68.1	67.1
A	2	-8	-0.05	0.60	439	-0.08	-5.1	1.00	0.60	9.5	68.2	67.3
A	1	-8	0.00	0.55	440	0.00	0.0	1.00	0.55	8.0	65.2	64.5
B	7	5	0.00	0.70	439	0.00	0.0	1.00	0.70	5.0	73.5	73.2
B	6	-3	0.00	0.65	439	0.00	0.0	1.00	0.65	3.0	70.8	70.7
B	5	0	0.00	0.57	439	0.00	0.0	1.00	0.57	0.0	66.3	66.3
B	4	-1	0.00	0.48	439	0.00	0.0	1.00	0.48	1.0	60.9	60.8
B	3	-2	0.00	0.32	439	0.00	0.0	1.00	0.32	2.0	49.7	49.7
B	2	-3	0.00	0.25	438	0.00	0.0	1.00	0.25	3.0	43.9	43.8
B	1	-15	-0.02	0.27	438	-0.07	-4.5	1.00	0.27	15.7	45.7	44.0
C	7	0	-0.01	0.41	437	-0.02	-1.5	1.00	0.41	1.5	56.2	56.2
C	6	0	-0.02	0.42	436	-0.05	-2.9	1.00	0.42	2.9	56.9	56.8
C	5	0	-0.02	0.37	437	-0.05	-3.3	1.00	0.37	3.3	53.4	53.3
C	4	-2	-0.01	0.37	437	-0.03	-1.7	1.00	0.37	2.6	53.4	53.3
C	3	-6	0.02	0.36	437	0.06	3.6	0.99	0.36	7.0	52.6	52.2
C	2	-3	0.02	0.40	437	0.05	3.2	1.00	0.40	4.4	55.4	55.3
C	1	-9	0.02	0.36	437	0.06	3.6	0.99	0.36	9.7	52.6	51.8
F	7	-7	-0.05	0.55	440	-0.09	-5.5	1.00	0.55	8.9	65.3	64.5
F	6	-3	-0.04	0.53	440	-0.08	-4.6	1.00	0.53	5.5	64.1	63.8
F	5	-6	-0.06	0.50	441	-0.12	-7.2	1.00	0.50	9.4	62.4	61.5
F	4	-1	-0.03	0.59	443	-0.05	-3.1	1.00	0.59	3.3	67.7	67.6
F	3	-8	-0.03	0.66	441	-0.05	-2.8	1.00	0.66	8.5	71.5	70.7
F	2	-10	0.00	0.60	442	0.00	0.0	1.00	0.60	10.0	68.1	67.1
F	1	-9	0.07	0.52	445	0.13	8.9	0.99	0.52	12.6	63.4	61.9
E	7	-10	0.00	0.52	441	0.00	0.0	1.00	0.52	10.0	63.4	62.4
E	6	-5	0.01	0.52	442	0.02	1.2	1.00	0.52	5.1	63.4	63.2
E	5	-7	0.02	0.54	442	0.04	2.4	1.00	0.54	7.4	64.6	64.1
E	4	-3	0.00	0.55	441	0.00	0.0	1.00	0.55	3.0	65.2	65.1
E	3	-9	0.00	0.53	441	0.00	0.0	1.00	0.53	9.0	64.0	63.2
E	2	-10	0.00	0.53	441	0.00	0.0	1.00	0.53	10.0	64.0	63.0
E	1	0	0.02	0.55	440	0.04	2.3	1.00	0.55	2.3	65.1	65.1
D	7	1	0.00	0.49	440	0.00	0.0	1.00	0.49	1.0	61.5	61.5
D	6	-2	0.02	0.45	438	0.04	2.8	1.00	0.45	3.5	58.8	58.7
D	5	0	0.02	0.42	437	0.05	3.1	1.00	0.42	3.1	56.8	56.7
D	4	0	0.01	0.39	437	0.03	1.6	1.00	0.39	1.6	54.8	54.7
D	3	0	0.00	0.36	437	0.00	0.0	1.00	0.36	0.0	52.6	52.6
D	2	-3	-0.01	0.30	437	-0.03	-2.1	1.00	0.30	3.6	48.1	48.0
D	1	2	0.00	0.25	437	0.00	0.0	1.00	0.25	2.0	43.9	43.8

RESULTS

Yaw Angle:	4.4 degrees	Stack Temperature:	439 F
Pitch Angle:	-1.0 degrees	Velocity*:	60.18 fps (feet per sec.)
Resultant Angle:	5.9 degrees	Axial Velocity:	59.71 fps
Standard Deviation:	4.0 degrees		

*velocity in the direction of flow

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STRATIFICATION CHECK

Client: UCOS COLMAC
Project #: 1409-40985
Unit No: 2
Date: 6/28/94

Point	O_2 pt	Ref O_2	% Diff	Point	O_2 pt	Ref O_2	% Diff
F5	7.0	7.0	0.0%	C5	6.5	6.4	-1.6%
F4	6.4	6.5	1.5%	C4	6.6	6.6	0.0%
F3	7.3	7.4	1.4%	C3	6.5	6.6	1.5%
F2	7.0	7.0	0.0%	C2	6.4	6.4	0.0%
F1	6.7	6.7	0.0%	C1	7.4	7.5	1.3%
E5	6.5	6.5	0.0%	B5	6.0	6.1	1.6%
E4	6.7	6.8	1.5%	B4	6.2	6.3	1.6%
E3	7.1	7.1	0.0%	B3	6.5	6.6	1.5%
E2	6.9	7.0	1.4%	B2	6.7	6.8	1.5%
E1	6.7	6.8	1.5%	B1	6.6	6.7	1.5%
D5	6.9	7.0	1.4%	A5	7.1	7.3	2.7%
D4	6.3	6.4	1.6%	A4	6.7	6.9	2.9%
D3	7.2	7.2	0.0%	A3	7.4	7.5	1.3%
D2	7.7	7.7	0.0%	A2	6.7	6.8	1.5%
D1	7.0	7.0	0.0%	A1	6.4	6.6	3.0%

O2 Stratification= 1.0%

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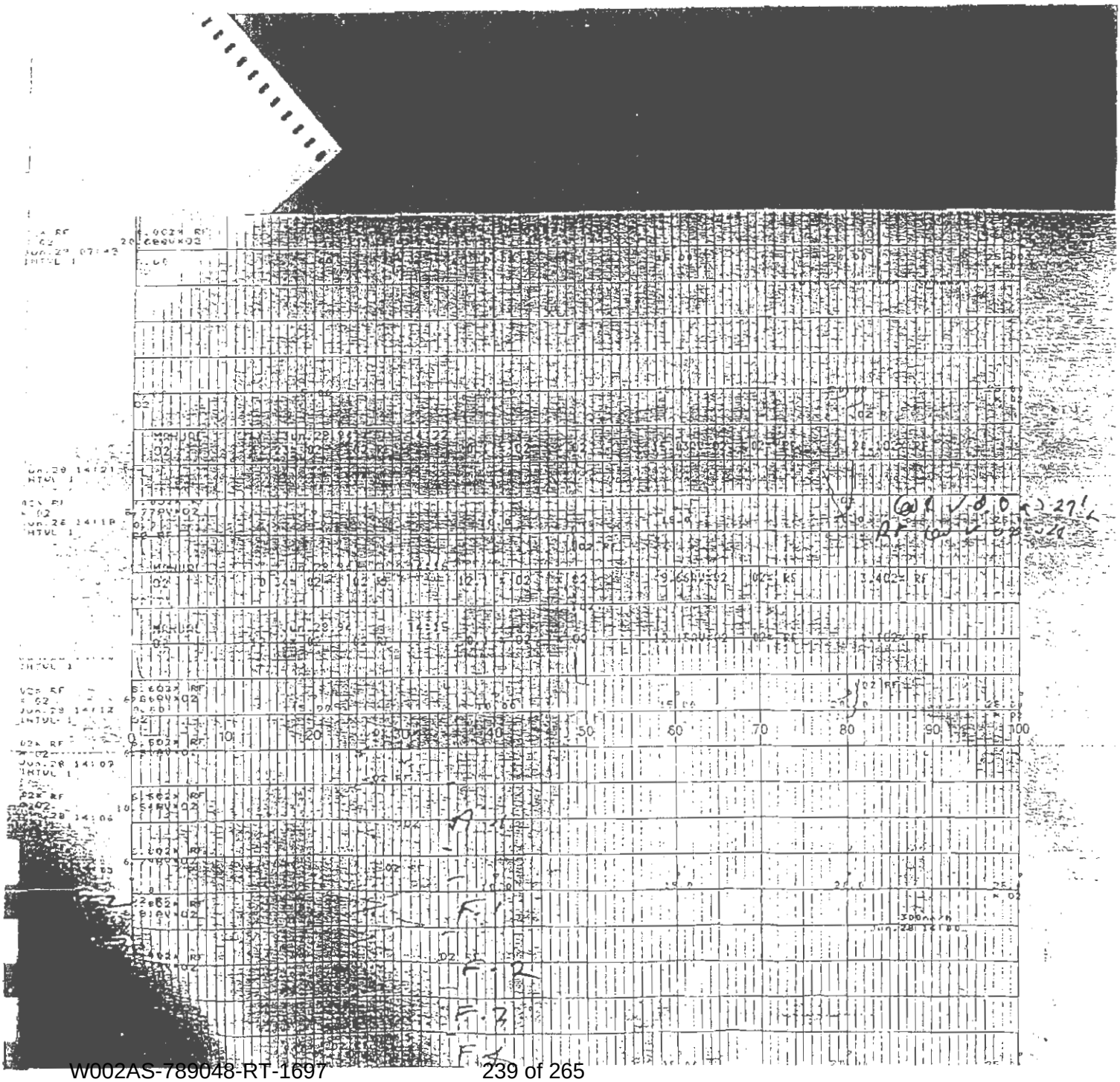
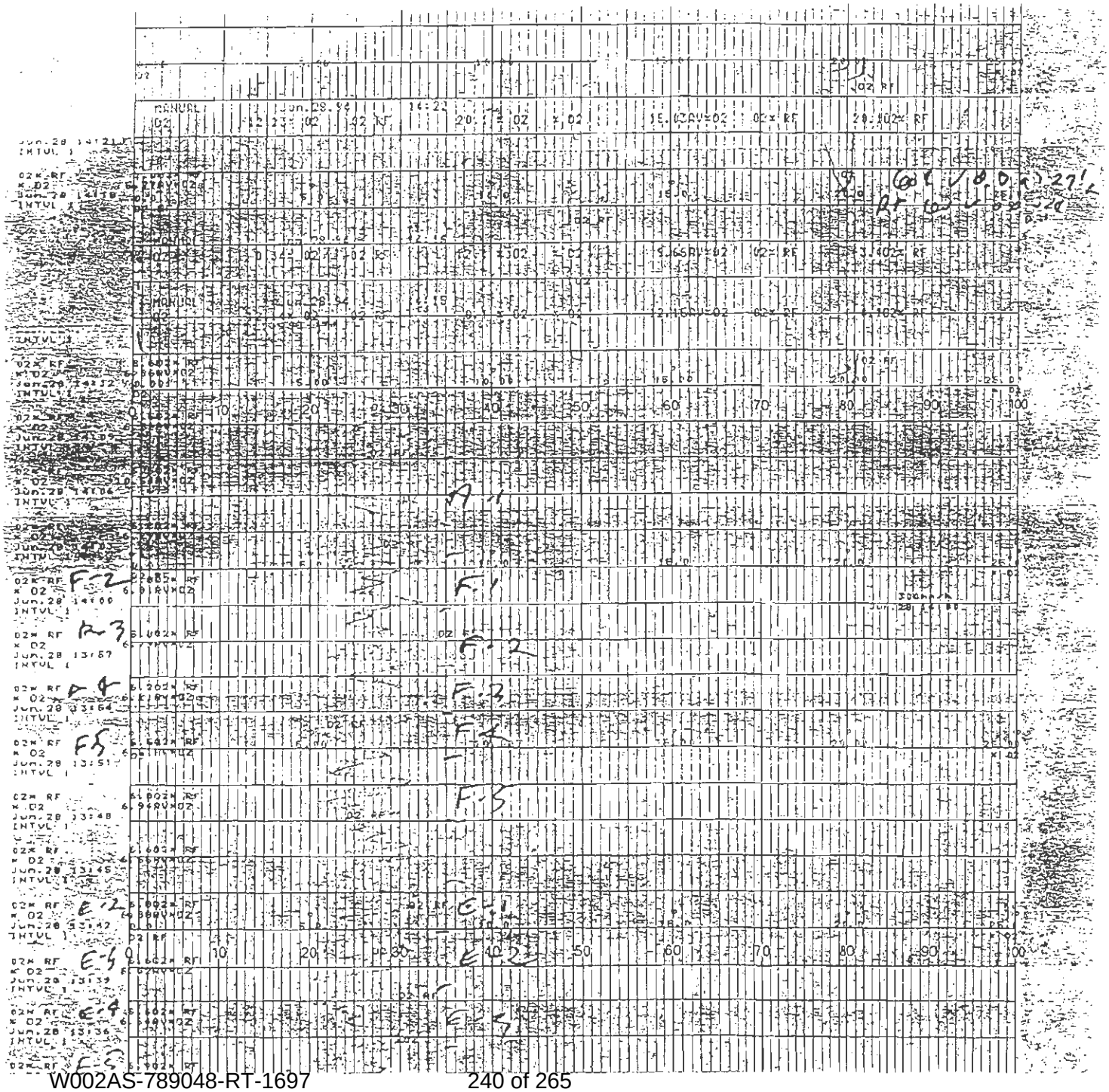
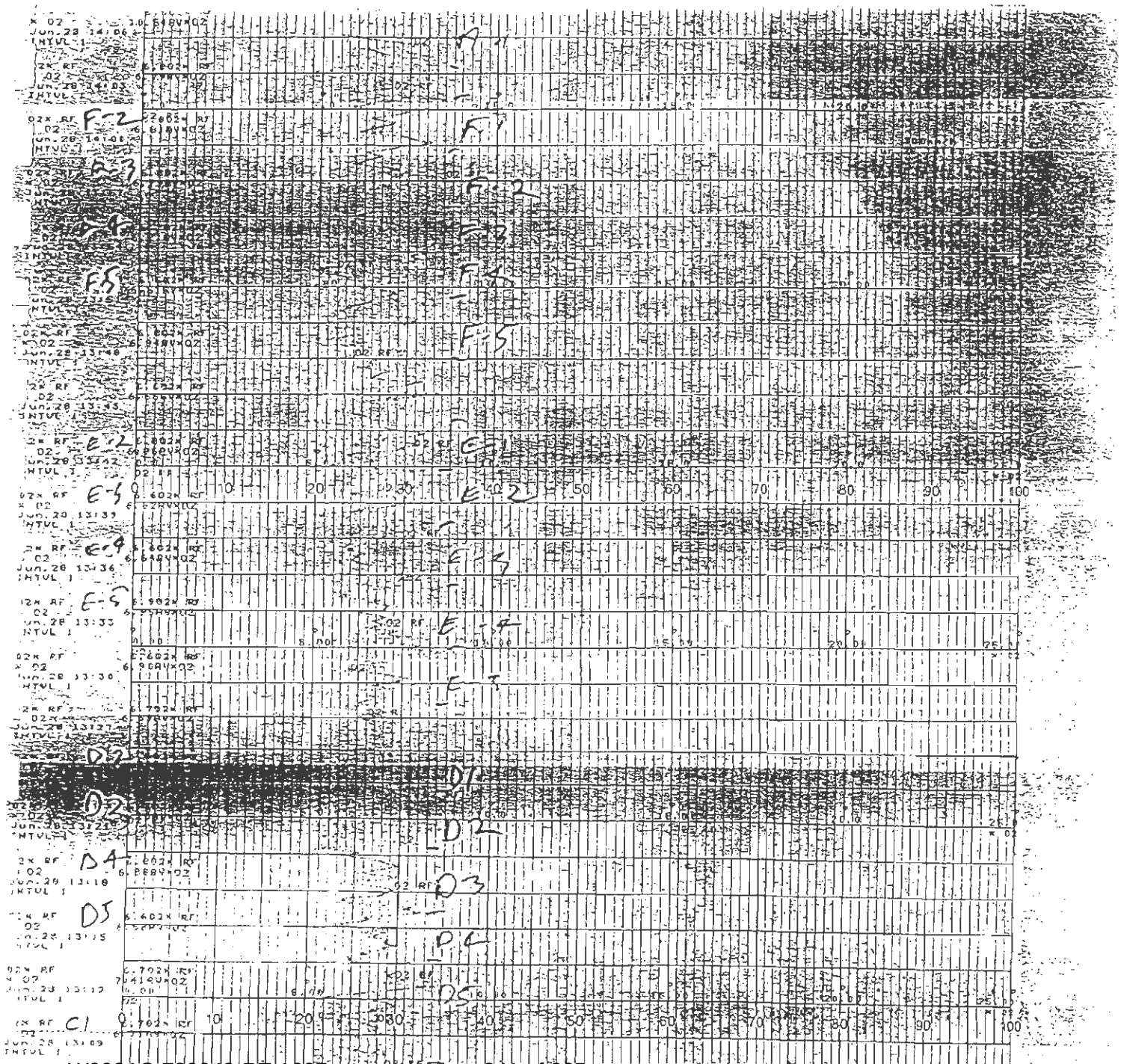
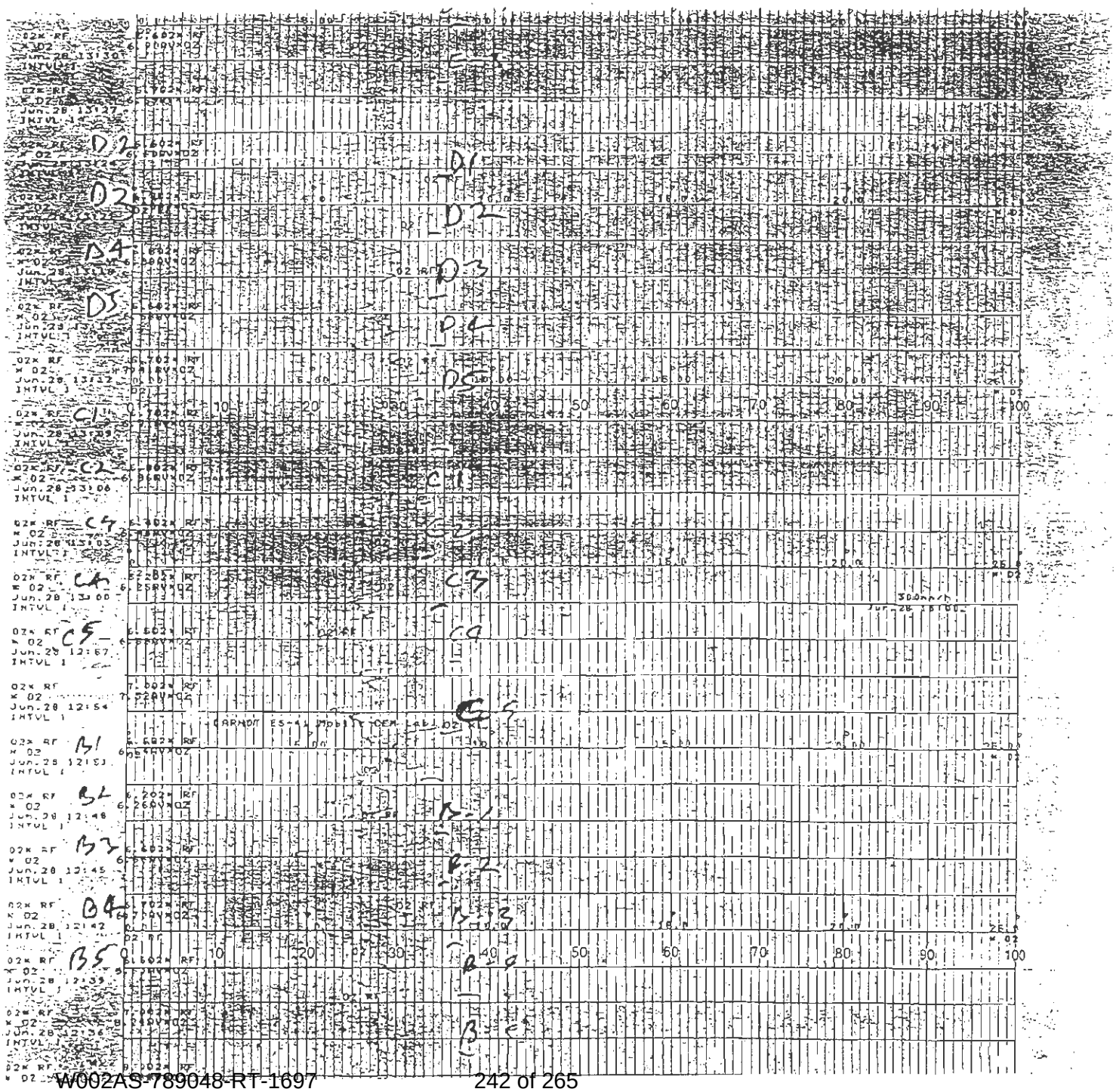
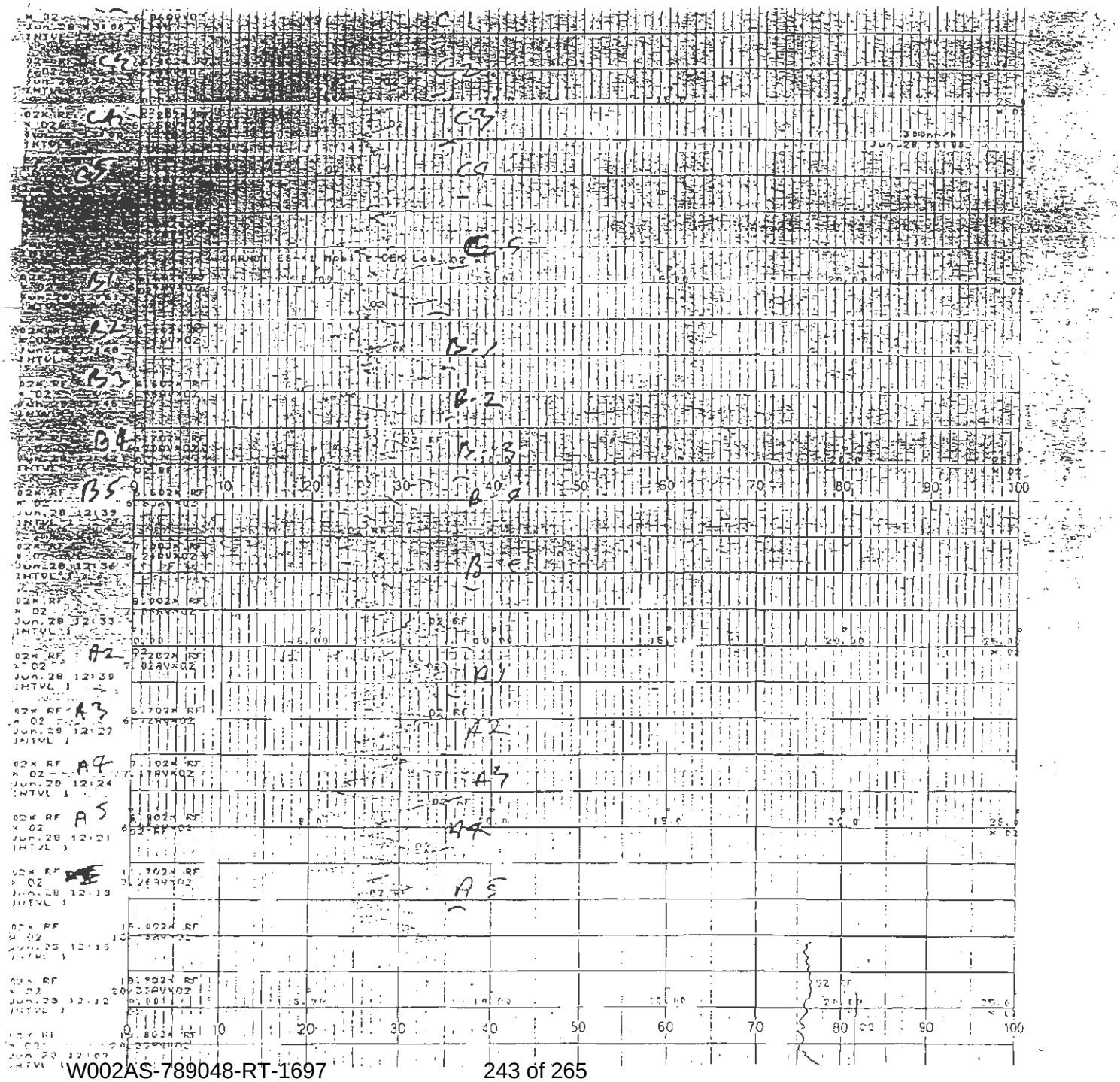
APPENDIX E
STRIP CHARTS

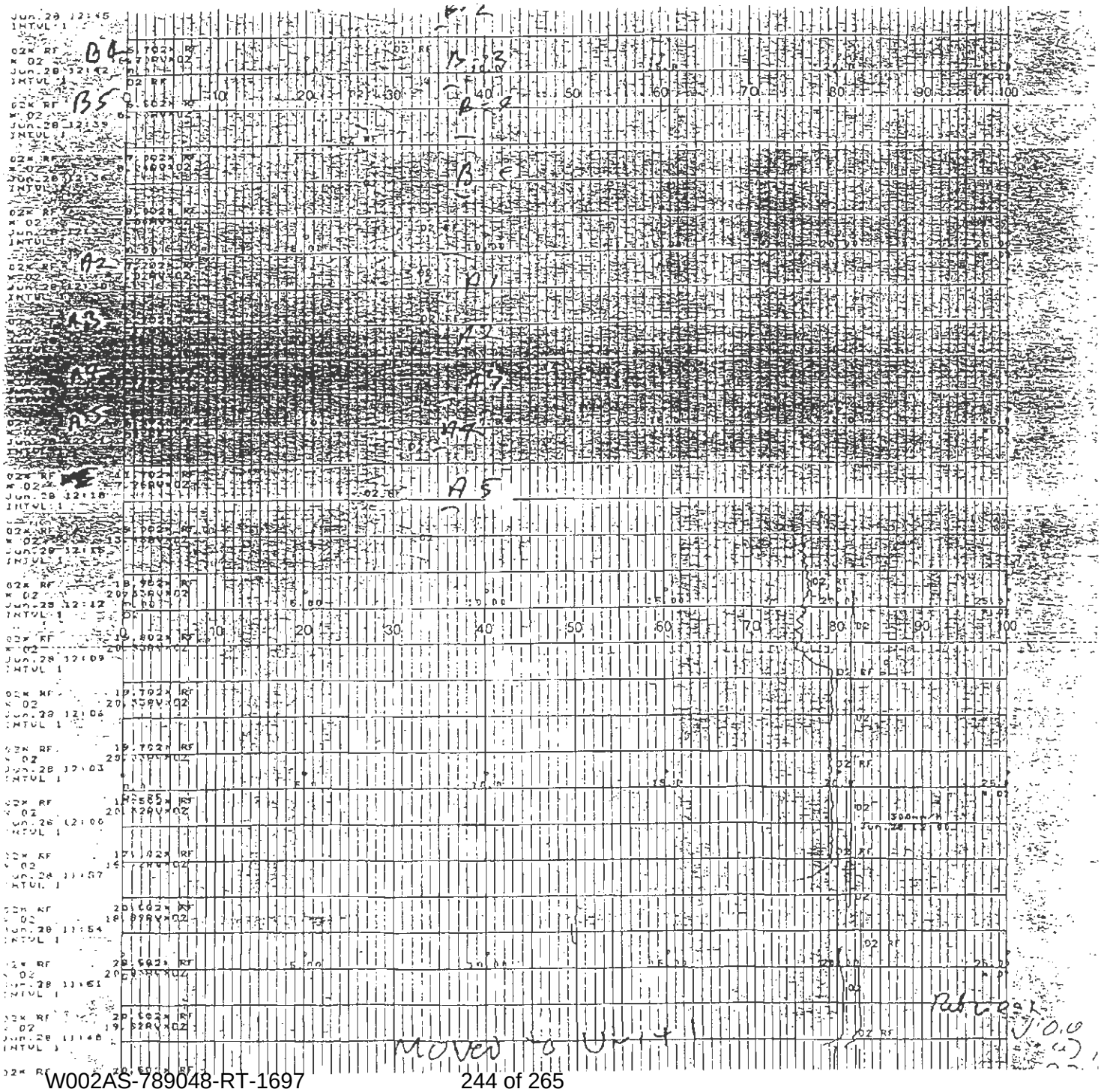


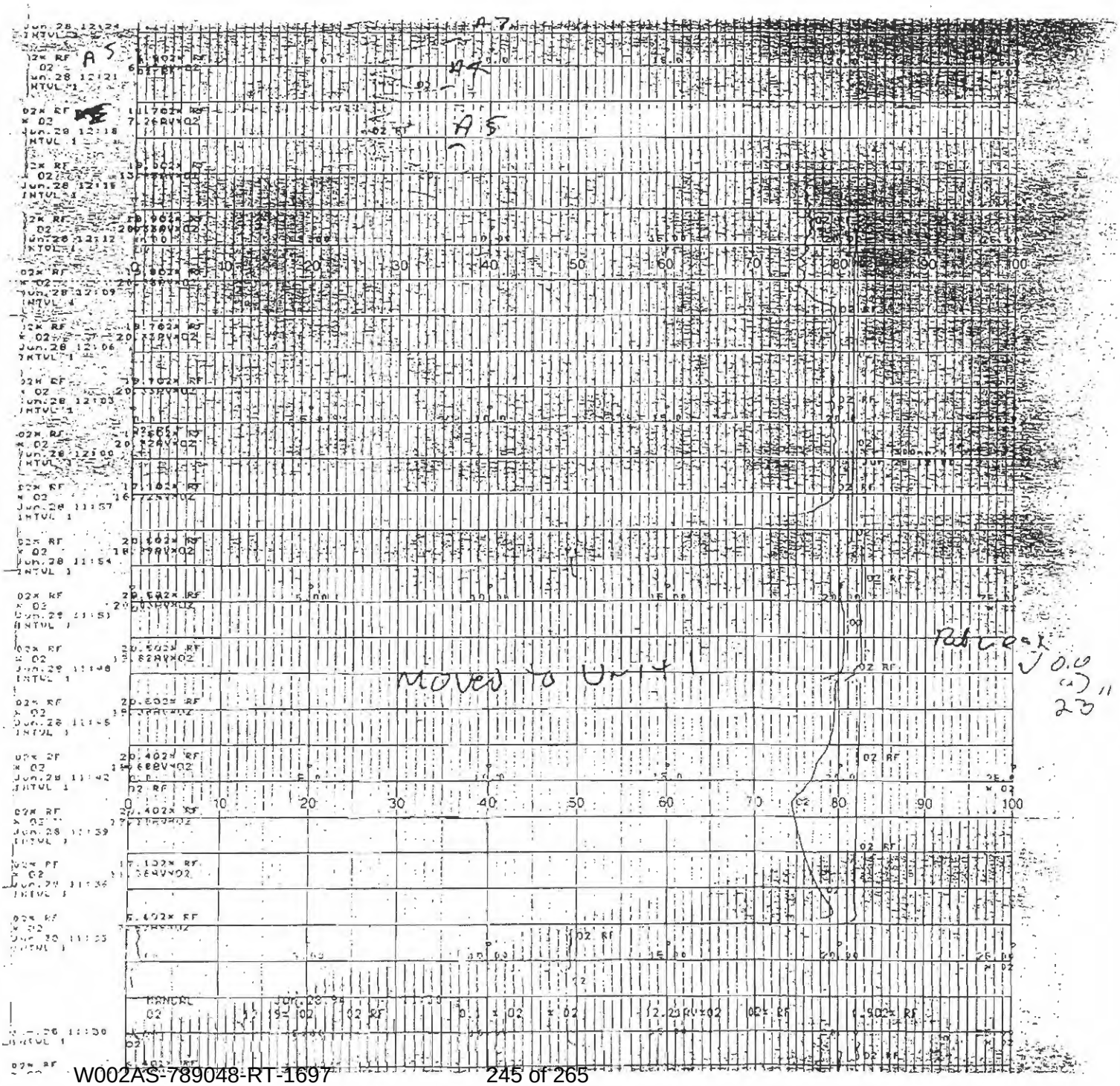


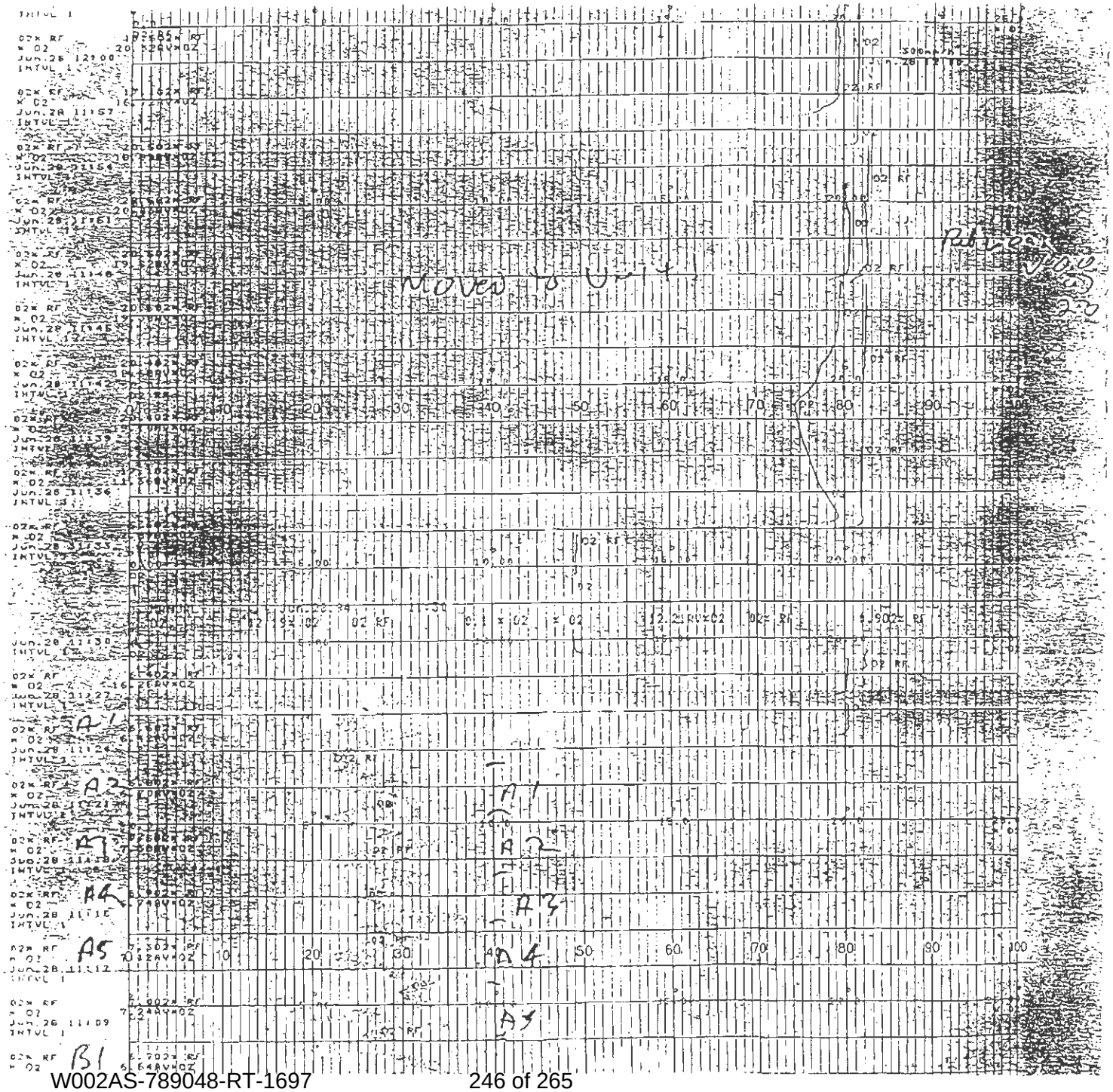


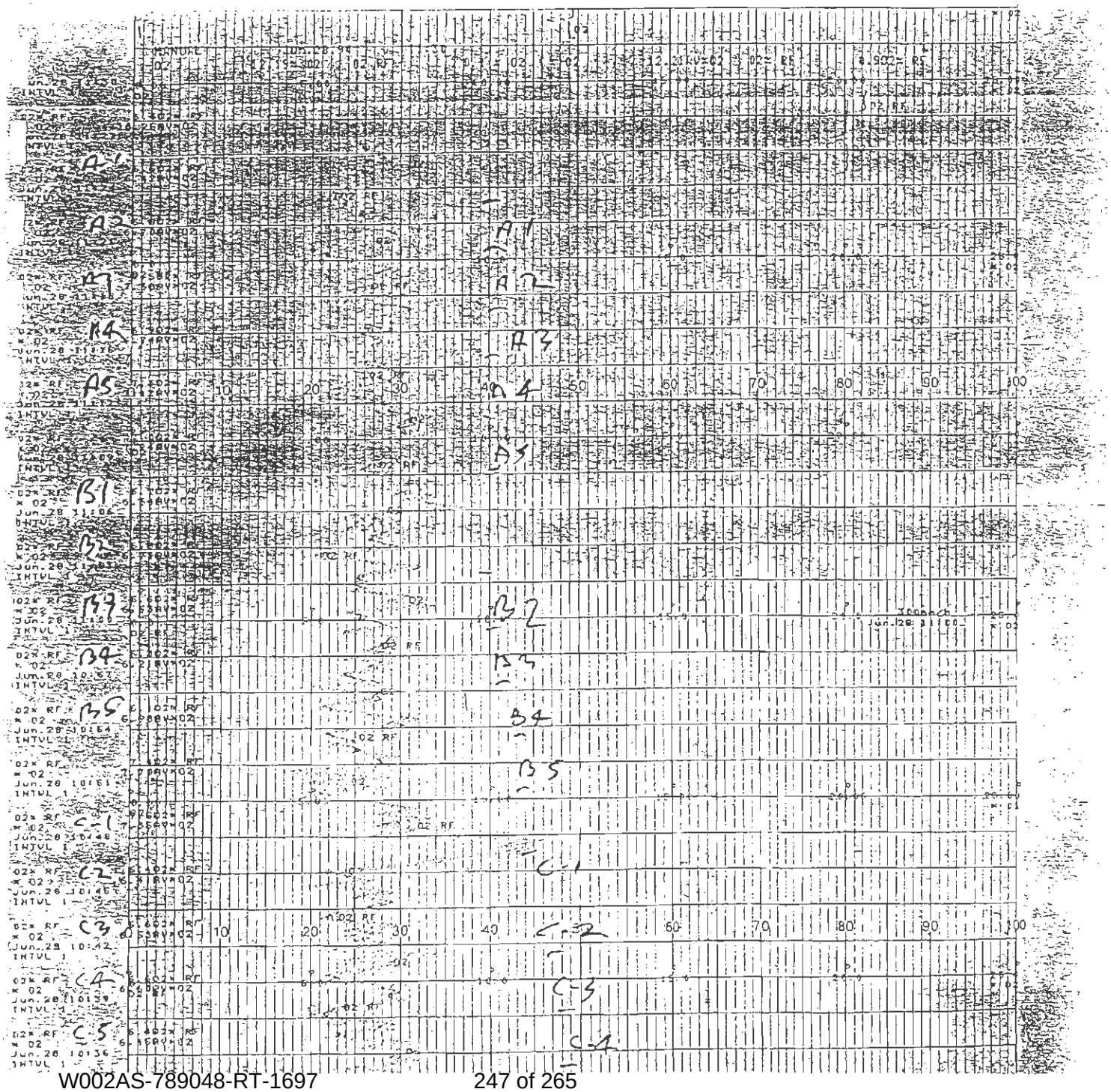


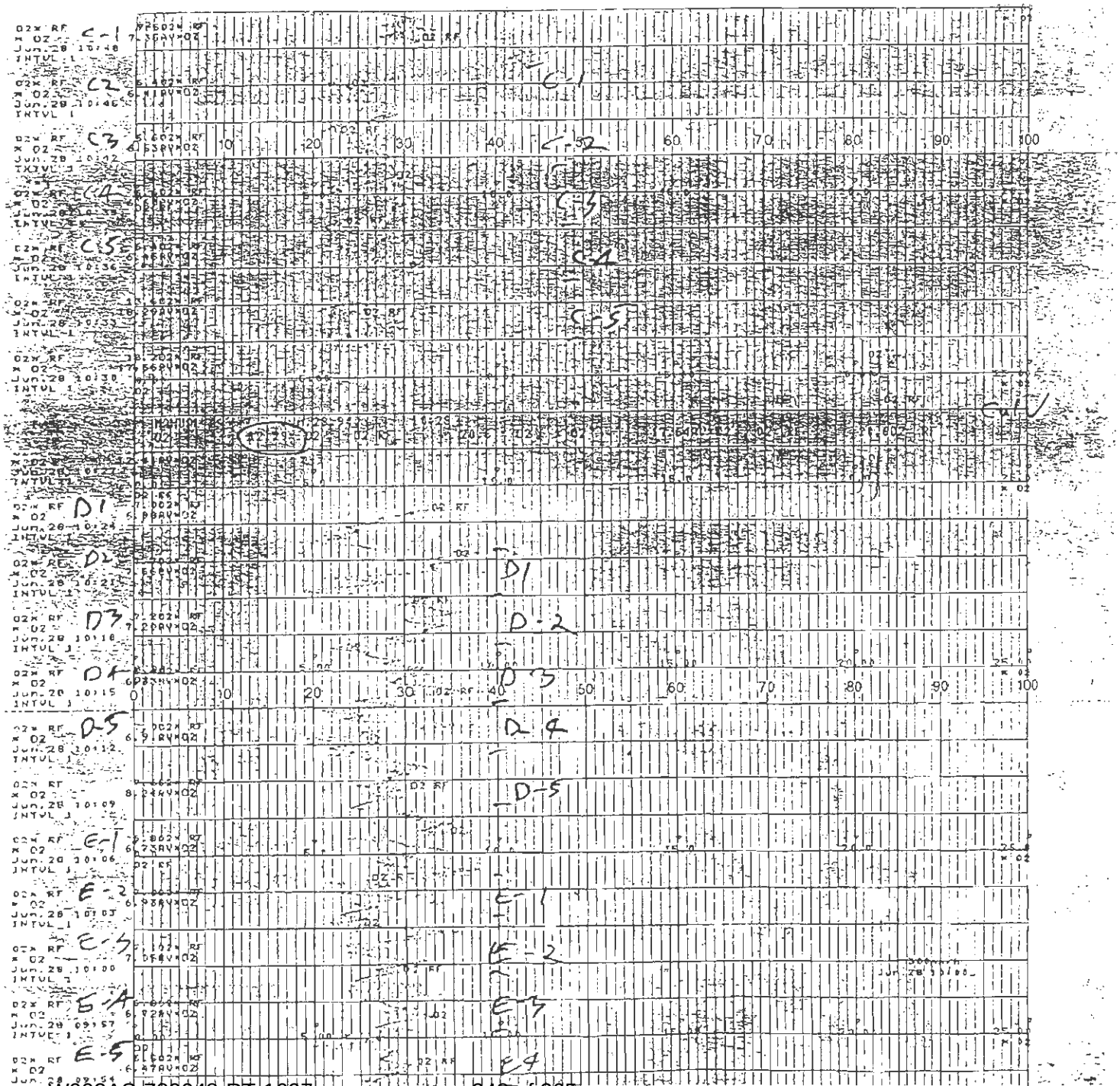


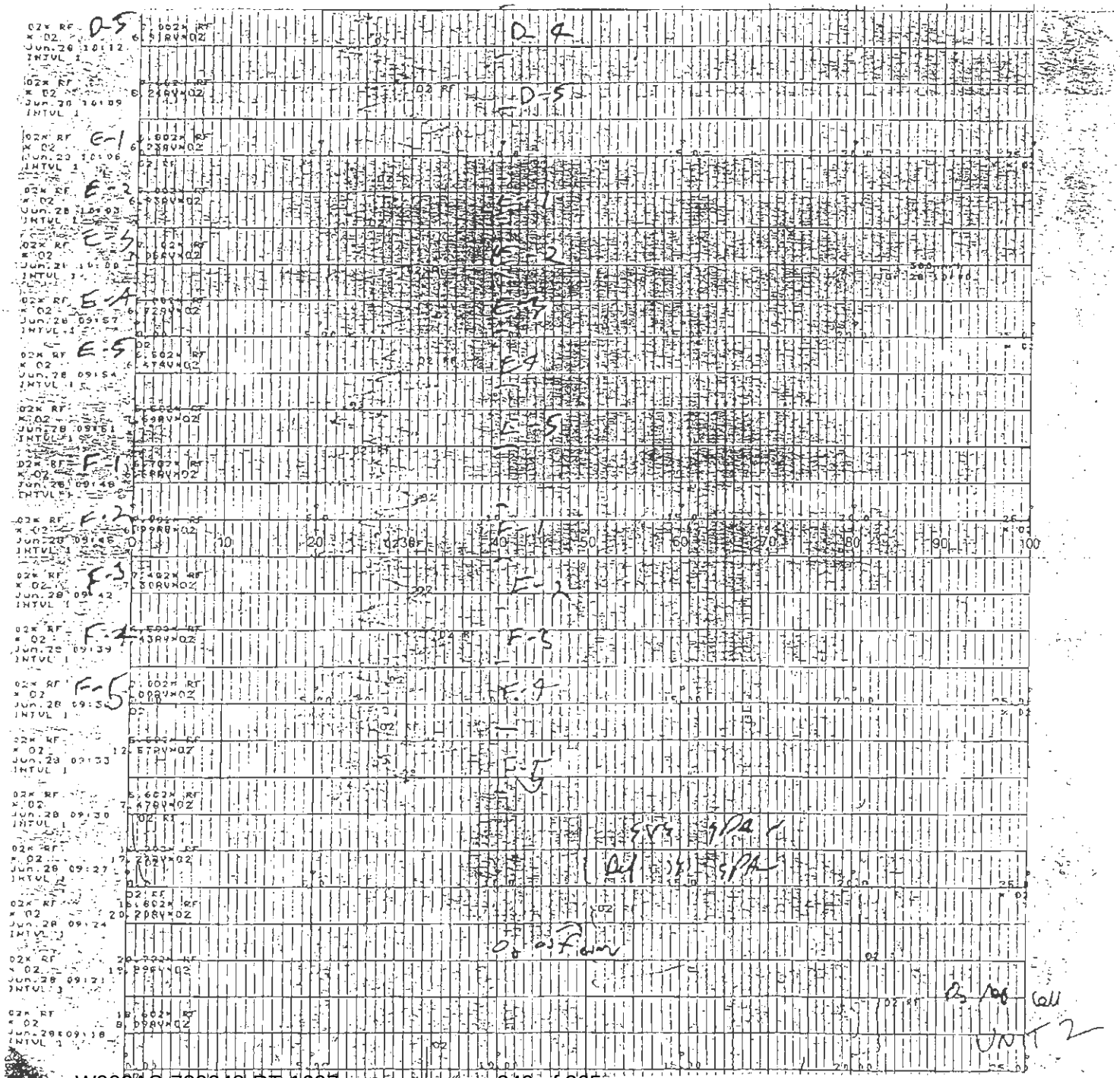

B4
B5
A2
A3
A4
A5
A6
A7
B1
B2
B3
B4
B5
B6
B7
A5
MOVED TO UNIT


A5
A7
A4
A5
MOVED TO UNIT
MANUAL


Moves to Unit
A1
A2
A3
A4
A5
B1




C-1
C-2
C-3
C-4
C-5
D1
D-2
D3
D4
D-5
E-1
E-2
E-3
E-4
E-5



APPENDIX C
SITE SAFETY PLAN

Site Safety Plan Booklet

Finalized: April, 2018

Introduction

Employee safety is the top priority of Montrose Environmental Group. All employees must be trained to mitigate the hazards faced each day. The site manager and project manager/lead are responsible to ensure all hazards have been proper identified and managed. All employees have Stop Work Authority in all situations where an employee feels they cannot perform a job safely or a task for which they have not been adequately trained.

The Site Safety Plan (SSP) has been developed to help assist Montrose test crews with identifying physical and health hazards that could harm our employees and determining how the hazards will be managed. Additionally, the SSP will help each crew manage the health of the employees by providing emergency procedures and information.

The booklet contains all the different safety forms that you may need in the field into one document. The SSP consists of the following:

1. A standardized, two-page, fillable pdf, form that is used as the Hazard Analysis and Safety Plan
2. Hazard Control Matrix - contains useful information on both engineering and administrative controls that a crew can use to reduce or eliminate the hazards they have observed plus applicable PPE that may be required
3. Tool Box Meeting Record – Keeps a daily record of the scheduled testing for the day and a short refresher of the hazards that were identified in the test location SSP and any hazard controls/PPE
4. Additional Forms
    a. Aerial Lift Inspection Form
    b. Heat Stress Prevention Form
    c. Extended Hours Form
    d. Safe Work Permit

An SSP for each location must be completed or at least started prior to mobilization and included as part of your Project Test Plan. Each test crew will then assess the hazards again while on-site looking for changes or new hazards. Once an SSP is completed, it will need to be reviewed before set up at each of your client's testing locations. Any day a SSP is not reviewed, a Tool Box Meeting will need to be completed.

The SSP is a living document. Each test crew should update the plan as new hazards are found. The client project manager should continually update their SSPs as new information and conditions result in new or changed hazards. The goal is to provide each crew with the most up-to-date hazard and safety information

MAQS Site Safety Plan

Client	Desert View Power	Contact Name	Kevin Lawrence	Date	01/15/20
Location	Mecca, CA	SSP Writer	Dave Wonderly	PM	

Job Preparation

☐ Job Site Walk Through Completed ☐ Site Specific Training Complete ☐ Certified First Aid Person _____
☐ Site Walk Through Needed ☐ Site Specific Training Needed ☐ Other:

Facility Information/Emergency Preparedness

Plant Emergency # (760) 396-2554 Identify and Locate the following:
On-Site EMS ☐ Yes ☒ No Evacuation Routes to main gate
EMS Location _____ Severe Weather Shelter Source test trailer
Nearest Urgent Care Facility: _____ Rally Point Main Gate
_____ Location of Eye Wash/Safety Shower:

Source Information: (list type)

Flue Gas Temp. (^{o}F) 350 Flue Gas Press. ("H_2O) 0.1 Flue Gas Components NOx, SO2, HCL, NH3
Flue Gas Inhalation Potential? ☒ Yes ☐ No
Describe Hazard Protection Plan: Keep ports closed and or covered, use a acid gas resperator as needed.

Required PPE ☒ Hard Hats ☒ Safety Glasses ☒ Steel Toed Boots ☒ Hearing Protection

Additional PPE Requirements

☐ Hi-Vis Vests ☐ Harness/Lanyard* ☐ Goggles ☐ Personal Monitor Type: _____
☐ Metatarsal Guards ☐ SRL(s) ☐ Face Shield ☐ Respirator Type: acid gases
☐ Nomex/FRC ☐ Hot Gloves ☐ 4-Gas Monitor ☐ Other PPE:

Critical Procedures – check all that apply – "*" indicates additional form must be completed

☐ Hot Weather Work* ☐ Confined Space* ☐ Aerial Work Platform* ☐ Roof Work ☐ Scaffold
☐ Cold Weather Work ☐ Lock out/Tag Out ☐ Exposure Monitoring ☐ Other:

Working at Heights Management

Fall Protection Plan ☒ Fixed Guardrails/Toeboards ☐ Fall Protection PPE ☐ Warning Line
Describe Hazard Protection Plan: Large well protected platform 20" above grade.

Falling Objects Protection Plan

☐ Barricading ☐ Netting ☒ House Keeping ☐ Tethered Tools ☐ Catch Blanket or Tarp ☐ Safety Spotter
Describe Hazard Protection Plan:

MAQS Site Safety Plan

Fall Hazard Communication Plan

☐ Adjacent/Overhead Work ☐ Contractor Contact ☐ Client Contact

Describe Communication Plan:

Environmental Hazards - Weather Forecast

☐ Heat/Cold ☐ Lightning ☐ Rain ☐ Snow ☐ Ice ☐ Tornado ☐ Wind Speed _____

Describe Hazard Protection Plan:

Additional Work Place Hazards

Physical Hazards	**Hazard Controls**
☐ Nuisance Dust Hazards	☐ Dust Mask ☐ Goggles ☐ Other:
☐ Thermal Burn	☐ Hot Gloves ☐ Heat Shields ☐ Other Protective Clothing:
☐ Electrical Hazards	☐ Connections Protected from Elements ☐ External GFCI ☐ Other:
☐ Inadequate Lighting	☐ Install Temporary Lighting ☐ Headlamps
☐ Slip and Trip	☐ Housekeeping ☐ Barricade Area ☐ Other:

Describe Hazard Protection Plan:

List of Hazardous Chemicals

				Other Chemicals:
☑ Acetone	☐ Nitric Acid	☑ Hydrogen Peroxide	Compressed Gases	☐
☐ Hexane	☐ Sulfuric Acid	☑ Isopropyl Alcohol	☐ Flammable Gas	☐
☐ Toluene	☐ Hydrochloric Acid	☐ Liquid Nitrogen	☑ Non-Flammable Gas	☐

Describe Hazard Protection Plan: Use of glovers when handling liquid reagents.

Wildlife/Fauna

Describe Hazard Protection Plan:

Crew Names & Signatures

Print Name	Signature	Date	Print Name	Signature	Date

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Ergonomic: Strains/Sprains	The manual movement of equipment to testing location can cause strains	• Eliminate manual “lifts” and use elevators and/or cranes when possible. Stairs can also be used where feasible. • Use lifting straps and locking carabiners to eliminate the need to continuously tie and untie loads. • Use pulley system to eliminate improper ergonomics when lifting and facilitate sharing of loads • Winches should be evaluated and used as much as possible to assist • Equipment should be staged on table or other elevated platform to assist with rigging, lifting and prevent bending over when securing equipment to hoist. • Maintain radio contact between ground and platform to ensure the process is going smoothly or if a break is needed.	• Stretching prior to and after lifting and lowering tasks to keep muscles and joints loose • Break loads into smaller more manageable portions • 3 man lift teams during initial set up and tear down w/2 below and one above • Job rotation and/or breaks during initial set up and tear down. • Discuss potential hazard and controls during tailboard meetings • Observe others and comment on technique	• Gloves, appropriate to task
Falling objects	When working from heights there is a potential of falling objects from elevated work platform striking someone or something below	• Ensure job area is barricaded off with hazard cones, caution tape and/or appropriate warning signs. Specific measures should comply with local plant rules. • Ensure a spotter is present during a lift or lowering of equipment. • Catch blanket should be used on the platform to prevent objects from falling through any grating. • Magnetic trays should be used to hold flange bots and nuts. • Tools should be tethered to platform or personnel uniform.	• Review hazards with any adjacent workers & the client so they understand the scope and timing of the job • Follow proper housekeeping practices by keeping the test location neat and orderly, keeping trash in bags and non-essential equipment stored when not in use. • Perform periodic job site inspections to ensure housekeeping is being observed • Review “grab and twist” method of handling tools and equipment between employees	• Hardhat • Steel toed boots • Work clothes

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Fall	Fall hazard exists when working from above 4' with no guardrails	• Verify anchor point • Warning Line system	• Review Working from Heights procedure prior to job • Maintain 3 points of contact when climbing stairs or ladders • Ensure all fall protection equipment has been inspected and is in good working order	• Harness and Lanyard
Burn	Flue gas temperature can be elevated and that can lead to hot temperature testing equipment. Hot pipes or other duct work at plant.	• Use heat resistant refractory blanket insulation to seal port once probe is inserted. Use duct tape to further seal the outer flange area of the port. • Use heat resistant blankets to shield workers from hot sources	• Work in tandem with partner to immediately fill sample port with heat resistant refractory insulation • Stand up wind of port when opening. If stack pressure is greater than 2" H_2O, a face shield is required. • Allow appropriate time to handle probes • Notify all team members at the test location when a probe is removed from a hot source and communicate to all crew members to exercise caution handling or working near the probe	• High temp. gloves • Long gauntlets • Long sleeve shirts • FRC
Atmosphere	Air concentrations could be above PEL	• Probe are to be sealed to prevent stack gases from leaking out • Ventilation, open all doors and window to dilute concentrations in work area • Vent analyzer or meter outside	• Stand up wind of ports • Use a gas monitor to ensure levels of contaminants are below PEL	• Respirator • SAR
Hearing	Production areas of plants could be high	NA	• Set up equipment or trailer as far away as possible from noise producing plant equipment.	• Ear plugs • Ear muffs (check with plant contact on exposure levels)

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Fire	High flue gas temps, chemicals, electricity could cause fire	• Fire extinguisher at job location	• Observe proper housekeeping • If conducting hot work, review procedures and permitting with site contact	• N/A
Weather	Conditions may pose significant hazards	• Weather App warning	• Lightning policy • JHA review of weather daily • Plant severe weather warning systems	• Appropriate clothing for conditions
Hot Weather	Extreme hot temperatures can cause physical symptoms	• Shade • Reduce radiant heat from hot sources • Ventilation fans	• Frequent breaks • Additional water or electrolyte replenishment • Heat Stress Prevention Form • Communication with workers • Share work load	• Appropriate clothing for conditions • Sunscreen
Cold Weather	Extreme cold temperatures can cause physical symptoms	• Hand warmers • Heaters • Wind blocks	• Calculate wind chill • Frequent warm up periods • Communication with workers	• Appropriate clothing for conditions
AWP	Overhead and ground hazards pose dangers	• Ensure all fall protection equipment has been inspected and is in good working order • Barricade off area where AWP is in use	• AWP pre-use inspection can identify problems with equipment • Site walk through can identify overhead and ground hazards	• Hardhat • Steel toed boots • Safety glasses • Harness/lanyard • Gloves
Scaffold	Fall hazard	• Yellow tagged scaffold may require harness & lanyard • Inspect harness & lanyard prior to use • Barricades • Netting	• Scaffold inspection prior to use can identify if scaffold meets OSHA regulations • Current scaffold training	• Hardhat • Steel toed boots • Safety glasses • Harness/lanyard

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Chemicals	Chemical fumes or splashing can cause asphyxiation or burns	• Chemical containers stored properly • Ventilation • Properly labeled secondary containers	• Spill kit training • Lab SOP • Good housekeeping • Personal hygiene	• Safety glasses • Chemical gloves • Lab coat • Ventilation • Goggles/Face shield as needed

Daily Tool Box Meeting Record

Client: _____ **Job No.:** _____ **Location:** _____ **Date:** _____

Scope of Work: _____

_____

_____

Changes in Hazards Any significant change in Hazards, update Site Specific Plan and sign off.

Site Specific Plan review

☐ ***Emergency Preparation*** ____ Rally Point ____ Alternate Exits ____ Obstacles in Route

☐ ***Source*** ____ Stack Temp. ____ Static Pressure ____ Flue gas contaminants

☐ ***PPE***

____ Hard Hats	____ Safety Glasses	____ Steel Toed Boots	____ Hearing Protection
____ Hi-Vis Vests	____ Harness*	____ Goggles	____ Personal Monitor Type: _____
____ Metatarsals	____ SRL	____ Face Shield	____ Respirator Type: _____
____ Nomex/FRC	____ Hot Gloves	____ 4-Gas Monitor	____ Other PPE: _____

☐ ***Critical Procedures***

____ Scaffold	____ Aerial Work Platform*	____ Confined Space*
____ LOTO	____ Roof Work	____ Exposure Monitoring

☐ ***Fall Protection*** ____ Guardrails ____ Fall Protection ____ Warning Lines

☐ ***Working at Heights***

____ Barricading	____ Tethered Tools	____ Netting
____ Housekeeping	____ Catch Blanket	____ Other: _____

☐ ***Barricades***

____ Morning Inspection _____ Printed Name _____ Signature

____ EOBD Inspection _____ Printed Name _____ Signature

☐ ***Communication*** ____ Adjacent/Overhead Work ____ Contractor Contact ____ Client Contact

☐ ***Weather***

____ Forecast	____ Lightning	____ Wind Speed	____ Wind Direction
____ Temperature	____ Cold	____ Hot*, *above 91°F use Heat Stress Prevention Form*	
____ Fluids Reminder	____ Proper Clothing	____ Ice-Rain	____ Snowy

☐ ***Workplace Hazards*** ____ Dust ____ Electrical ____ Slips, Trips & Falls ____ Thermal Burn ____ Lighting

☐ ***Chemical***

____ Labeling	____ PPE	____ Cylinders Secured
____ Storage	____ Ventilation	____ Sample Storage

☐ ***Surroundings***

____ Site Traffic	____ Trucks	____ Forklifts
____ Construction	____ Cranes	____ Wildlife/Fauna
____ Machine Guarding	____ Chemical	____ Upwind/downwind Hazards

☐ ***Harness & Lanyard***

Inspected by:

_____ Printed Name _____ Signature

_____ Printed Name _____ Signature

_____ Printed Name _____ Signature

_____
Tool Box Meeting Leader Signature

Test Crew Initials:

Notes:

Montrose Air Quality Services -Daily Aerial Lift Inspection Form

All checks must be completed before operation of the aerial lift. This checklist must be used at the beginning of each shift or after six to eight hours of use.

General Information (Check All That Apply)

Manually Propelled Lift: _____ **Self-Propelled Lift:** _____

Aerial Lift Model Number: _____ **Serial Number:** _____

Make: _____ **Rented Or Owned?** _____

Initial Description – Indicate by checking "Yes" that an item is adequate, operational, and safe. Check "No" to indicate that a repair or other corrective action is required prior to use. Check "N/A" to indicate "Not Applicable."

Number Item to be Inspected	Yes	No	N/A
A. Perform a visual inspection of all aerial lift components, i.e. missing parts, torn or loose hoses, hydraulic fluid leaks, etc. Replace as necessary	☐	☐	☐
B. Check the hydraulic fluid level with the platform fully lowered	☐	☐	☐
C. Check the tires for damage. Check wheel lug nuts for tightness	☐	☐	☐
D. Check the hoses and the cables for worn areas or or chafing.	☐	☐	☐
E. Check for cracked welds	☐	☐	☐
F. Check the platform rails and safety gate for damage	☐	☐	☐
G. Check for bent or broken structural members	☐	☐	☐
H. Check the pivot pins for security	☐	☐	☐
I. Check that all warning and instructional labels are legible and secure	☐	☐	☐
J. Inspect the platform control. Ensure the load capacity is clearly marked	☐	☐	☐

Initial Description – Continued

Number	Item to be Inspected	Yes	No	N/A
K.	Check for slippery conditions on the platform	☐	☐	☐
L.	Verify that the Manufacturer's Instruction Manual is present inside the bucket	☐	☐	☐
M.	Check the hydraulic system pressure (See manufacturer's specifications). If the pressure is low, determine the reason and repair in accordance with accepted procedures as outlined in the service manual	☐	☐	☐
N.	Check the base controls for proper operation. Check switches and push buttons for proper operation	☐	☐	☐
O.	Check the platform controls for proper operation. Check all switches and push buttons, as well as ensuring that the drive controller returns to neutral	☐	☐	☐
P.	Verify that a fire extinguisher is present, mounted, and fully charged and operational inside the bucket	☐	☐	☐
Q.	Verify that the aerial lift has headlights and a safety strobe-light installed and fully operational	☐	☐	☐
R.	Verify that the aerial lift has a fully functional back-up alarm	☐	☐	☐

Print Name of Individual Inspecting Location Date

Aerial Location Date Lift

Heat Stress Prevention Form

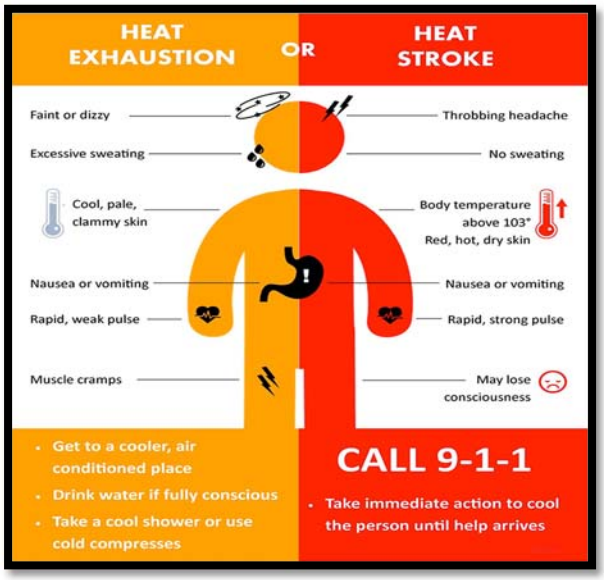
This form is to be used when the Expected Heat Index is above 91 degrees F. Keep the form with project documentation.

Project Location:_____

Date:_____Project Manager:_____

Expected High Temp:_____Expected High Heat Index:_____

1. Review the signs of Heat Exhaustion and Heat Stroke
2. If Heat Index is above 91 degrees F:
    a. Provide cold water and/or sports drinks to all field staff. Avoid caffeinated drinks and energy drinks which actually increase core temperature. Bring no less than one gallon of water per employee.
    b. If employee are dehydrated, on blood pressure medication or not acclimated, ensure they are aware of heightened risk for heat illness.
    c. Provide cool head bands, vests, etc.
    d. Have ice available to employees.
    e. Encourage work rotation and breaks, particularly for employees working in direct sunlight.
    f. Provide as much shade at the jobsite as possible, including tarps, tents or other acceptable temporary structures.
    g. PM should interview each field staff periodically to look for signs of heat illness.
3. If Heat Index is above 103 degrees F:
    a. Employees must stop for drinks and breaks every hour (about 4 cups/hour).
    b. Employees are not permitted to work alone for more than one hour at a time without a break with shade and drinks.
    c. Employees should wear cool bands and vests if working outside more than one hour at a time.
    d. PM should interview each field staff every 2 hours to look for signs of heat illness.



Project Number:_____ Date:_____ Time:_____

Whenever a project is going to extend past a 14-hourwork day, an Extended Hours Safety Audit to access the condition of their crew and the safety of their work environment must be completed. If a senior tech or a FPM is leading a project, they should confer with the CPM but they will need to get permission to proceed from the DM or RVP. CPMs need to get permission to proceed from the DM or RVP. Technical RVPs can authorize moving forward if they are in the field or if they own the project. DMs and RVPs may make the call in the field.

☐ Hold test crew meeting. Test Crew Initials:

"Extended or unusual work shifts may be more stressful physically, mentally and emotionally. Non-traditional shifts and extended work hours may disrupt the body's regular schedule, leading to increased risk of operator error, injuries and/or accidents."

The test leader should look for signs of the following in their crews:

- Irritability
- Lack of motivation
- Headaches
- Giddiness
- Fatigue
- Depression
- Reduced alertness, lack of concentration and memory

The test leader should assess the environmental and hazardous concerns:

- Temperature and weather
- Lighting
- Climbing
- Hoisting
- PPE (respirators, ect.)
- Pollutant concentration in ambient air (SO_2, H_2S, ect.)

☐ Notify DM or RVP Name:

The test leader must contact either the DM or RVP to discuss the safety issues that may arise due to the extended work period. During this time, they can come to an agreement on how to proceed.

Things to discuss are why the long hours?
Client or our delays?
Production limitations?
Impending Weather?

☐ Contact client

The test leader, DM or RVP should discuss with client any of our safety concerns, the client's needs and come to agreement on how to proceed. Discussion should also include the appropriate rest period needed before the next day's work can begin. The DM and/or a RVP must be kept in the loop on what the final decision is.

What was the outcome?

SAFE WORK PERMIT

A. WORK SCOPE (to be completed by MEG) – Check relevant box(es) to indicate type(s) of work.						
□ Hot Work	□ Line Break	□ Lock-out Tag-out	□ Other		**Permit Timing**	
Specific Location:					Date:	Time:
Equipment Worked On:					Valid Until	
Work to be Performed:					Date:	Time:

B. POTENTIAL HAZARDS (To be completed by MEG)			
□ Flammable	□ Harmful to breathe	□ Harmful by Skin Contact	
□ Verify process hazards have been reviewed			
C. PERSONAL PROTECTIVE EQUIPMENT (Check all additional equipment that is required)			
○ Tyvek Suit	○ Hearing Protection	○ H2S Monitor	○ Flash Hood
○ Rain Gear	○ Goggles	○ Safety Harness & Life Line	○ Life Vest
○ Chemical Resistant Gloves	○ Face shield	○ Tripod ER Escape Unit	○ Supplied Air Respirator
○ Rubber Boots	○ Organic Vapor Respirator	○ Fall Protection Equipment	○ Dust Respirator
○ Other:			
D. CHECK LIST (Check what has been completed)			
○ Joint Job Site Visit	○ Electrical Isolation Completed	○ Line Identified	○ Equipment Water Flushed
○ Equipment Depressurized	○ Isolated and locked out	○ Equipment Identified	○ Equipment Inert Gas Purged
○ Vents Opened & Cleared	○ Blinds in Place	○ Electrical Equipment Still Live	○ Written JSA Completed
○ Atmosphere Tested	○ Electrical Equipment Still Live	○ Equipment Still Live	○
Other:			
E. PRECAUTIONS (Check what must be completed PRIOR to commencing work)			
○ Cover Sewers	○ Scaffolding Inspection Done	○ Charged Hose/Area Wet	○ Communication Device(s)
○ Air Mover (Grounded)	○ Fire Extinguisher	○ Covered Cable Trays	○ Fire Watch
○ Barricade/Signs	○ Fire Resistant Blanket	○ Continuous Air Monitoring	
○ Other:			
○ Designated Fire Watch Individual and Start time (30 min after hot work):			
○ Fire Watch Complete (signature and time):			

F. HAZARD ANALYSIS (add additional information to form as necessary)

	Job Steps	Potential Hazards	Hazard Controls
1.			
2.			
3.			
4.			

I VERIFY THAT THE ABOVE CHECK LIST "D" HAS BEEN COMPLETED, ALL OTHER CONDITIONS ("B", "C", "E", "F") ARE UNDERSTOOD AND WHEN MET, THE AREA IS SAFE FOR WORK TO COMMENCE.			
Name:	Signature:	Date:	Time:

THIS IS THE LAST PAGE OF THIS DOCUMENT

If you have any questions, please contact one of the following individuals by email or phone.

Name:	Mr. David Wonderly
Title:	Client Project Manager
Region:	West
Email:	DWonderly@montrose-env.com
Phone:	(714) 279-6777

Name:	Mr. Matt McCune
Title:	Regional Vice President
Region:	West
Email:	MMccune@montrose-env.com
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